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University of Kentucky
College of Agriculture, Food and Environment
Cooperative Extension Service

AGMatters

April 2024 *Produce, Tobacco & Dairy News*

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Billions of Teenage Bugs

Dr. Jonathan Larson, Kentucky Pest News, 04.16.24

Periodical cicadas have been in the news in 2024 as there will be a pair of broods emerging at the same time this year. This pairing is of Brood 13 and Brood 19, the combination of which will result in cicadas showing up across much of the central and southeastern U.S. (from southern Wisconsin all the way down to Georgia), and it hasn't happened since Thomas Jefferson was president. So, why all the hoopla and what will be seen in Kentucky?

What is a periodical cicada?

These unique insects are seven different species of cicadas. There are three species that live for 17 years below ground and four that do so for 13 years. They usually begin to emerge in early May (or right around the time that your irises are in bloom) and are black with bright red eyes and orange-tinged wings. They are distinct from the annual cicadas heard singing every summer and autumn. Those species are larger, emerge later in the year, are usually a mixture of green, black, and brown, and take 2 to 3 years to develop belowground.

Once they are above ground, periodical cicadas fly to trees where males begin to sing. First, they recruit other males to join their band and then they start to jam together, singing at levels that can rival the decibels of a jet plane. Females then fly to the trees where they pair with males that sing a courtship song to them. After mating, males usually perish while females begin laying their eggs in the twigs of trees.

Figure 1: An adult periodical cicada resting on a leaf. Their stark coloration, a mixture of black, red, and orange, helps to distinguish them from other cicadas. (Photo: Jonathan L. Larson, UK)

Some answers to other commonly asked questions about periodical cicadas:

- They emerge in large numbers as a strategy of predator satiation. They come out in waves from May into June/early July; many of the insects in the first wave will be eaten by birds, snakes, dogs, and numerous other animals. Eventually, everyone gets tired of cicada lunches and the remaining insects have a greater chance to survive.
- Cicada nymphs can detect the ebb and flow of tree sap in tree roots as they feed belowground. This cue tells them when 13 or 17 years have passed. As for why 13 or 17 years: developing on these prime number lines has helped to prevent predators or parasitoids from specializing on periodical cicadas.
- Yes, you can eat them. Though we stress caution for those with shellfish allergies and highlight that you should cook them and consume them in moderation.

Buckets of Bugs

There has been immense media coverage of this emergence as people are interested and horrified, and it promises to be quite the parade of nature. Brood 13 is located mainly in Illinois but can also be found in Indiana, Wisconsin, and Iowa. This is one of the 17-year broods, meaning that these insects were last above ground in 2007. The other brood is Brood 19, which is a 13-year brood known as the "Great Southern Brood," and they were last aboveground

continued on pg. 8

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Upcoming **Events**

May 2
Private Applicator Training
Christian County Office, 8AM
Hopkinsville, KY

May 4
Pecan Grafting Demo
Boaz, KY

May 13
Pennyrile Beekeepers
Christian County Office

May 14
Wheat Field Day
UKREC, Princeton KY

June 10
Drone Pilot Prep Course
Hopkins County Office

June 18
Twilight Tour
Fairview, KY (more details soon)

July 23
Corn, Soybean & Tobacco Field Day
UKREC, Princeton KY

Pythium Disease

Kentucky Pest News, 04.09.24, Kim Leonberger and Nicole Gauthier

Pythium diseases can affect a large number of vegetable crops. Vegetables produced in structures, such as greenhouses or high tunnels, may be at an increased risk for disease losses once the pathogen is introduced. Infections may impact above and below ground plant parts, resulting in plant decline or fruit rot. Cultural management strategies and fungicides may be used to limit the impact of Pythium diseases.

Pythium Disease Facts

- Pythium diseases can impact plant roots, stems, and crowns. Root infections result in brown, rotting roots, while stem infections appear as lesions that girdle stems or crowns. Both types of diseases can result in wilting, stunting, reduced vigor, yield reduction, nutrient deficiency-like symptoms, and plant death. Early plant infections cause damping-off

- Pythium diseases can also cause damage to fruit. Symptoms include sunken, wet, or slimy lesions. Over time, a white, cottony growth can cover infected portions of fruit (Figure 1). Disease development frequently occurs where fruit are in contact with soil. Disease development can occur in the field or in storage.

- Wet soils from excess irrigation or rainfall are conducive for disease development.

- Infested soil, water, tools, and plant debris can harbor disease causing pathogens.

- Caused by multiple species of Pythium, a fungus-like pathogen called a water mold.

Management Options

- Improve soil drainage.
- Avoid overwatering.
- Avoid introduction of natural soil into hydroponic systems.
- Use clean, new soil for seeding and transplanting.
- Clean and sanitize pots, tools, and structures.
- Avoid movement of infested soil. Work in clean fields first and infested sites last to avoid spread.
- Wash and disinfect tools, equipment, shoes, and clothing after working in infested fields, greenhouses, or tunnels.
- Apply a mulch layer to limit contact between fruit and soil.
- Infected fruit may not show symptoms at harvest, but disease may develop in storage. Damaged, wounded, and diseased materials should be discarded.
- Use approved fungicides labeled for Pythium spp.

Fig. 1. Fruit infected with Pythium develop a white, cottony growth. (Photo: Cheryl Kaiser, UK)

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Ethylene Damage on Tomato

Vegetable Crops Hotline, 04.04.24, Dan Egel

Almost every year, I have a greenhouse tomato grower or two call me about tomato plants that are distorted and don't seem to be growing right. The problem often turns out to be ethylene damage. This year, I have already received my first case of heater problem. Please read the article below to avoid or manage this problem.

Tomato plants with ethylene damage often have leaves that are curled down and stems that are twisted (Figure 1). Stems or leaves that are curled downwards are said to have epinasty (in botanical terms). Epinasty is a common symptom of ethylene damage. Ethylene is a common by-product of incomplete combustion of several different types of fuel. Incomplete combustion is often the result of heaters that are not working efficiently. Tomatoes are very sensitive to ethylene damage; however, other crops may also show ethylene damage.

The tomato plants in figure 1 also have yellow seed leaves. Ethylene damage does not include yellowing. Furthermore, there is a spotting on the lower leaves that is not typical ethylene damage. I believe that the symptoms on seed leaves were as a result of a different compound, perhaps sulfur dioxide, a heavier than air compound that would remain relatively close to the heater. In fact, the yellowing leaves were observed close to the heater, while the curling leaves, caused by ethylene gas, were spread throughout the greenhouse. The production of sulfur dioxide may also be as a result of incomplete combustion.

While some greenhouses are heated with a furnace attached to the greenhouse, many greenhouses are heated with a standalone unit inside the structure. In the example in figure 1, the grower stated that the heater was of this latter type-a standalone unvented unit. While this type of heating is not recommended, natural gas, propane and kerosene generally burn clean and do not need to be vented. However, even units that burn clean fuels may cause problems if out of adjustment.

I cannot prove that the symptoms in Figure 1 above are caused by ethylene. But a few years ago, we witnessed ethylene-like damage at a greenhouse here at the Southwest Purdue Agriculture Center. We were able to confirm that ethylene was the cause of the symptoms shown in Figure 2. Given the similarities of the two examples and the circumstantial evidence, I believe the example given in Figure 1 was due to a heater malfunction. The grower reports that after the heater was serviced, the plants began to look healthier.

Heating specialists should be able to measure ethylene, carbon monoxide and other products of incomplete combustion. The best time to measure incomplete combustion is after a cold night when the heaters have been running. Be sure to make such measurements before venting the greenhouse.

Poorly adjusted heaters can also add water to the greenhouse air-as much as 22 gallons of water a night! This unwanted moisture can lead to disease problems.

To avoid damage from ethylene and other air pollutants:

1. Have unit heaters checked by a professional and follow maintenance recommendations.
2. Assure adequate air supply for complete combustion. For each 2500 BTU's of heater output, 1 sq. in. of vent cross section is needed.
3. Prevent back drafts. Make sure the chimney extends 2 ft. above the ridge of the greenhouse, or 2 ft. above a 10-ft. line to any part of the structure.
4. Install an inexpensive carbon monoxide detector. If carbon monoxide levels rise it's likely ethylene and other pollutants are present also. And if carbon monoxide levels are high it is a significant human health hazard.
5. Scout for possible growth effects of ethylene and investigate right away if you see anything.

Figure 1. The tomato seedlings above exhibit downward curled leaves (see plant in upper left corner of photo) which maybe a symptom of ethylene damage and yellow seed leaves with lesions, a possible symptom of sulfur damage (Contributed Photo).

Figure 2. These tomato plants are exhibiting epinasty or a downward growth of the leaves in response to ethylene produced from a malfunctioning heater in a greenhouse. The topmost leaves are growing normally because the plants were removed to a separate greenhouse after exposure to ethylene. (Photo by Dan Egel).

Ideal Cucumber for High Tunnel

Vegetable Crops Hotline, Lopez and Ingwell, 04.17.24

Over the past two years, we've been testing various slicing and pickle-type cucumber cultivars to see which ones are most vulnerable to pests in high tunnel systems.

We evaluated 10 cultivars. The objective of our study was to evaluate the susceptibility of these varieties to the main arthropod pests, which include twospotted spider mite (TSSM), melon aphids, and striped cucumber beetle (StCB) numbers.

In the table, we have summarized our pest susceptibility findings in the chart, categorizing each pest as either low, moderate, or high susceptibility. When selecting cucumber varieties for your high tunnels, after choosing the fruit type that you desire, you should consider your pest pressures.

We hope that this table can be useful for you in selecting varieties that are less susceptible to your most pressing issues.

Cucumber Type	Cultivar	Pest Susceptibility Scores		
		TSSM	Aphids	StCB
Slicer	Corinto	High	Moderate	Moderate
Slicer	Socrates	High	Low	Moderate
Slicer	Itachi	Low	Moderate	High
Slicer	Tasty Jade	Low	Moderate	High
Slicer	Taurus	Low	Moderate	Moderate
Slicer	China Long	Low	Moderate	Moderate
Slicer	Poniente	High	High	Moderate
Pickle	Excelsior	High	Low	Moderate
Pickle	Quirk	High	Moderate	Low
Pickle	Adam Gherkin	High	Moderate	Moderate

Broccoli Brunch Casserole

Cooperative Extension Service

INGREDIENTS

- Nonstick cooking spray
- 8 ounces ground turkey sausage
- 3 1/2 cups broccoli florets, chopped
- 1 1/2 cups shredded, part skim mozzarella cheese, divided
- 8 eggs
- 1 cup part skim ricotta cheese
- 1/4 cup skim milk
- 1 teaspoon ground black pepper
- 1/2 teaspoon salt
- 1 Roma (plum) tomato, thinly sliced

DIRECTIONS

1. Preheat oven to 350 degrees F.
2. Spray a 9x13 baking dish with nonstick cooking spray.
3. Place a medium-sized skillet over medium heat.
4. Saute sausage until evenly brown, drain well, crumble, and cool slightly.
5. In a medium bowl, mix cooked sausage, broccoli and 1/2 cup of mozzarella.
6. In a separate bowl, whisk eggs until frothy and then combine with a 1/2 cup of mozzarella, ricotta cheese, milk, pepper, and salt.
7. Spread the egg mixture over the sausage mixture.
8. Sprinkle with remaining mozzarella, and arrange the tomato slices on top.
9. Cover with foil and bake for 30 minutes.
10. Uncover and bake for an additional 15 minutes. Let stand for 10 minutes before serving.

Yield: 8 slices

NOTES

Nutrition facts per serving: 260 calories, 16 g fat, 7 g saturated fat, 0 mg cholesterol, 550 mg sodium, 7 g carbohydrate, 1 g fiber, 1 g sugars, 20 g protein

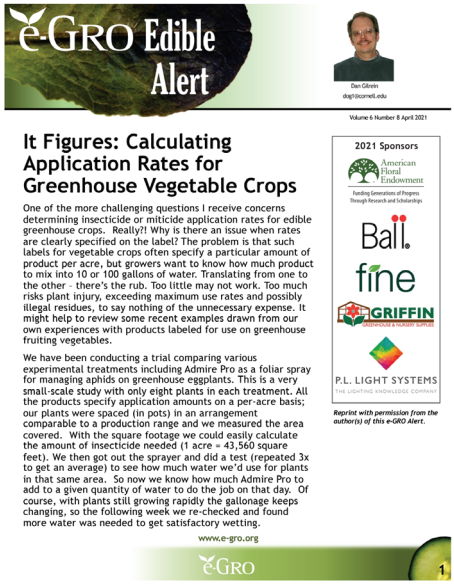
e-Gro Releases New Publications

Electronic Grower Resources Online(e-GRO) is a collaborative effort of floriculture specialists to create a new clearing house for alerts about disease, insect, environmental, physiological and nutritional disorders being observed in commercial greenhouses. Information is available about disorders, podcasts, and research.

Bringing together some of the leading specialists from universities around the USA, e-GRO is a free resource and learning tool for anybody involved in greenhouse plant production.

In addition to the featured e-Gro Alerts on this page, there are several alerts on bedding plant crops. Contact the office if you need a copy of these or other e-Gro alerts.

e-GRO Electronic Grower Resources Online


e-GRO Edible Alert

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Volume 6 Number 8 April 2021

It Figures: Calculating Application Rates for Greenhouse Vegetable Crops

One of the more challenging questions I receive concerns determining insecticide or miticide application rates for edible greenhouse crops. Really?! Why is there an issue when rates are clearly specified on the label? The problem is that such labels for vegetable crops often specify a particular amount of product per acre, but growers want to know how much product to mix into 10 or 100 gallons of water. Translating from one to the other - there's the rub. Too little may not work. Too much risks plant injury, exceeding maximum use rates and possibly illegal residues, to say nothing of the unnecessary expense. It might help to review some recent examples drawn from our own experiences with products labeled for use on greenhouse fruiting vegetables.

We have been conducting a trial comparing various experimental treatments including Admire Pro as a foliar spray for managing aphids on greenhouse eggplants. This is a very small-scale study with only eight plants in each treatment. All the products specify application amounts on a per-acre basis; our plants were spaced (in pots) in an arrangement comparable to a production range and we measured the area covered. With the square footage we could easily calculate the amount of insecticide needed (1 acre = 43,560 square feet). We then got out the sprayer and did a test (repeated 3x to get an average) to see how much water we'd use for plants in that same area. So now we know how much Admire Pro to add to a given quantity of water to do the job on that day. Of course, with plants still growing rapidly the gallonage keeps changing, so the following week we re-checked and found more water was needed to get satisfactory wetting.

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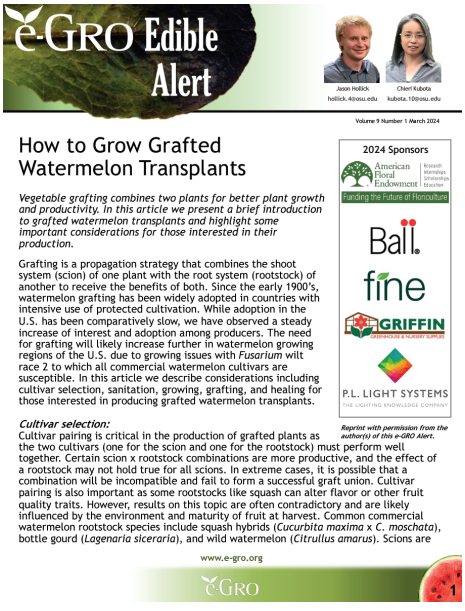
e-GRO Edible Alert

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Volume 9 Number 1 March 2024

How to Grow Grafted Watermelon Transplants

Vegetable grafting combines two plants for better plant growth and productivity. In this article we present a brief introduction to grafted watermelon transplants and highlight some important considerations for those interested in their production.

Grafting is a propagation strategy that combines the shoot system (scion) of one plant with the root system (rootstock) of another to receive the benefits of both. Since the early 1900's, watermelon grafting has been widely adopted in countries with intensive use of protected cultivation. While adoption in the U.S. has been comparatively slow, we have observed a steady increase of interest and adoption among producers. The need for grafting will likely increase further in watermelon growing regions of the U.S. due to growing issues with *Fusarium* wilt race 2 to which all commercial watermelon cultivars are susceptible. In this article we describe considerations including cultivar selection, sanitation, growing, grafting, and healing for those interested in producing grafted watermelon transplants.

Cultivar selection:

Cultivar pairing is critical in the production of grafted plants as the two cultivars (one for the scion and one for the rootstock) must perform well together. Certain scion x rootstock combinations are more productive, and the effect of a rootstock may not hold true for all scions. In extreme cases, it is possible that a combination will be incompatible and fail to form a successful graft union. Cultivar pairing is also important as some rootstocks like squash can alter flavor or other fruit quality traits. However, results on this topic are often contradictory and are likely influenced by the environment and maturity of fruit at harvest. Common commercial watermelon rootstock species include squash hybrids (*Cucurbita maxima x C. moschata*), bottle gourd (*Lagenaria siceraria*), and wild watermelon (*Citrullus amarus*). Scions are

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Volume 9 Number 3 March 2024

CEA is Growing: Trends from the U.S. 2022 Census of Agriculture

Every five years the United States Department of Agriculture collects comprehensive farm level data across all agricultural commodities. Data is summarized both statewide and nationally on land use, operators, employees, crops produced, and wholesale farmgate value. The most recent Census of Agriculture was conducted from all farms (urban and rural) with at least $1,000 in production value based on 2022 data.

The census was released in February, 2024 and shows some interesting trends for controlled environment agriculture (CEA).The full report (757 pages with 57 tables of data) can be accessed at https://www.nass.usda.gov/AgCensus/ where individual tables can also be downloaded. CEA is represented by the category "Food Crops Grown Under Glass or Other Protection" which refers to all types of protected growing structures from high tunnels to high tech greenhouses. National data is reported in Chapter 1, table 39 on page 47 and statewide data is in Chapter 2, table 34 on page 586.

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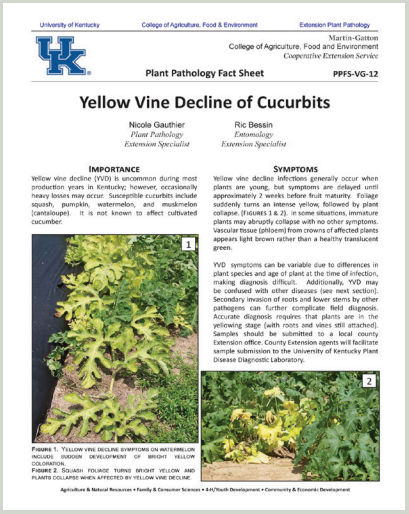
Publication Spotlight

Yellow Vine Decline of Cucurbits (PPFS-VG-12)

Yellow vine decline (YVD) is uncommon during most production years in Kentucky; however, occasionally heavy losses may occur. This bacterial disease is vectored (carried from plant to plant) by squash bug. Susceptible cucurbits include squash, pumpkin, watermelon, and muskmelon (cantaloupe).

This newly revised fact sheet discusses symptoms, how to distinguish YVD from diseases with similar symptoms, cause (pathogen and vector), disease development, and management recommendations.

Contact the Christian County Extension office to request a free copy - (270) 886-6328


University of Kentucky | College of Agriculture, Food & Environment | Extension Plant Pathology

Martin-Gatton College of Agriculture, Food and Environment
Cooperative Extension Service

Plant Pathology Fact Sheet PPFS-VG-12

Yellow Vine Decline of Cucurbits

Nicole Gauthier, *Plant Pathology Extension Specialist*
Ric Bessin, *Entomology Extension Specialist*

IMPORTANCE

Yellow vine decline (YVD) is uncommon during most production years in Kentucky; however, occasionally heavy losses may occur. Susceptible cucurbits include squash, pumpkin, watermelon, and muskmelon (cantaloupe). It is not known to affect cultivated cucumber.

SYMPTOMS

Yellow vine decline infections generally occur when plants are young, but symptoms are delayed until approximately 2 weeks before fruit maturity. Foliage suddenly turns an intense yellow, followed by plant collapse (FIGURES 1 & 2). In some situations, immature plants may abruptly collapse with no other symptoms. Vascular tissue (phloem) from crowns of affected plants appears light brown rather than a healthy translucent green.

YVD symptoms can be variable due to differences in plant species and age of plant at the time of infection, making diagnosis difficult. Additionally, YVD may be confused with other diseases (see next section). Secondary invasion of roots and lower stems by other pathogens can further complicate field diagnosis. Accurate diagnosis requires that plants are in the yellowing stage (with roots and vines still attached). Samples should be submitted to a local county Extension office. County Extension agents will facilitate sample submission to the University of Kentucky Plant Disease Diagnostic Laboratory.

FIGURE 1. YELLOW VINE DECLINE SYMPTOMS ON WATERMELON INCLUDE SUDDEN DEVELOPMENT OF BRIGHT YELLOW COLORATION.
FIGURE 2. SQUASH FOLIAGE TURNS BRIGHT YELLOW AND PLANTS COLLAPSE WHEN AFFECTED BY YELLOW VINE DECLINE.

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Weed Management Strategies

Vegetable Crops Hotline, 04.17.24,
Stephen Meyers and Jeanine Arana

Weeds can quickly take over vegetable farms, reducing yield and interfering with harvest. Effective weed management is vital for keeping farms efficient and productive. Because every farm is unique, there is no universal weed management solution. Prior to implementing a weed control strategy, you should properly identify the problematic weeds on your farm and establish your individual threshold, or level of tolerance, for weeds. While some farms practice a strict zero-tolerance policy for weeds, others embrace the presence of some weeds as a sign of biodiversity. In this guide, we compiled common weed management practices for vegetable production, organizing them into four categories: cultural, mechanical, biological, and chemical. Most farms will benefit from implementing combinations of these control measures into a broader Integrated Weed Management (IWM) program.

CULTURAL

Sanitation

Weeds can be transported in many different ways—for example, with water, wind, or attached to animal fur. Weeds can also be moved within and between fields on tools, equipment, machinery, and clothes. When moving from weed-infested fields to "clean" ones, remove soil and plant parts from boots, tools, tractor tires, and implements to avoid spreading problematic weeds.

Exclusion

Limit the risk of introducing weeds to your farm by using only inspected/tested seeds to ensure they lack noxious weeds and contain minimal other weed seeds. This is especially important for cover crop seeds. Weed seed can also be introduced onto a farm from contaminated straw or hay used as mulch and from field edges and fence rows.

Crop Rotation

Rotating crops can disrupt weed life cycles and reduce their population over time. The idea behind crop rotation for weed management is to alternate crops that are more vulnerable to weed infestations or have fewer weed management options with those that are more competitive or have more management options. For example, vegetables can be rotated with agronomic crops such as soybeans, corn, or winter wheat.

Cover Crops

Cover crops compete with weeds for light, water, and nutrients- much the same way weeds compete with crops. Some cover crops, like cereal rye, also release allelopathic compounds that can inhibit weed growth. Terminated cover crop residue provides a physical barrier to weed growth, which can prevent weed seed germination and/or emergence.

Figure 2. Marestail grows in a strip of land that was not planted with fall-seeded cover crops (center), while no marestail is present in the portion of the field planted with rapeseed (left) or cereal rye (right) (Photo by S.L. Meyers).

Plant Spacing

Planting crops at appropriate distances can reduce the time it takes to form a full crop canopy, thus shading out weeds more quickly.

Cultivar Selection

Choose varieties that grow well in your region or on your farm. Vigorous plants are more competitive with weeds. Crop canopies can vary among cultivars. Choosing cultivars that are quick to canopy or have dense shoot growth can shade weeds. Cultivars with vigorous root systems outcompete weeds by using soil nutrients and moisture more efficiently.

MECHANICAL/PHYSICAL

Tillage

In soils with a heavy presence of seeds on the upper soil surface, inversion tillage with a traditional plow can be used to deeply bury these seeds and prevent them from germinating. Avoid routine plowing, which will bring the buried seeds right back to the soil surface.

Cultivation

Cultivation implements come in many shapes and sizes but serve a similar function—to uproot small weed seedlings. Regular cultivation may be necessary if this is your primary method of weed control. Unfortunately, cultivation can increase the spread of perennial weeds like yellow nutsedge and Canada thistle because they spread vegetatively. Cultivation should target small weeds. It will be less effective against larger weeds and in wet soil conditions.

Figure 4. A tractor-mounted S-tine cultivator removes small weeds from row middles of plasticulture watermelon (Photo by J. Arana).

Hand-weeding/hand-hoeing

These practices are labor-intensive but can be an effective way to remove weeds that escape other control tactics, for example, herbicide-resistant weeds.

Flame Weeding

Burning weeds with propane torches or flame weeders is particularly effective for young, annual, broadleaf weeds. However, it only provides temporary control of perennial weeds.

Mulches

Applying synthetic or organic mulches can smother weeds and prevent sunlight from reaching weed seeds. The lack of sunlight prevents some weed seeds from germinating and

keeps others that do germinate from photosynthesizing. Synthetic mulches include plastic mulch and woven landscape fabric. Organic mulches are derived from plant materials and include wheat straw and tree bark.

Tarps

Plastic tarps can be used to create a stale seedbed or provide early-season weed control in slow-to-emerge crops like potatoes. Although different types of tarps can be used, silage tarps are most commonly used for this purpose. Silage tarps are thicker than plastic mulch and opaque, meaning that weeds that germinate beneath them do not receive sunlight and die. During the growing season, tarps are placed on planting beds for approximately 3 weeks and then removed immediately prior to planting/transplanting the crop.

Electrocution

Applying controlled electrical pulses directly to the weeds disrupts their cellular structure and kills them. Electrocution works best on upright, broadleaf weeds with a central leader and is less effective on grasses and perennial weeds. For example, tubers of electrocuted yellow nutsedge plants remained viable after electrocution treatments. Currently, most weed electrocution implements require larger tractors with greater horsepower to transfer enough electricity to the weeds.

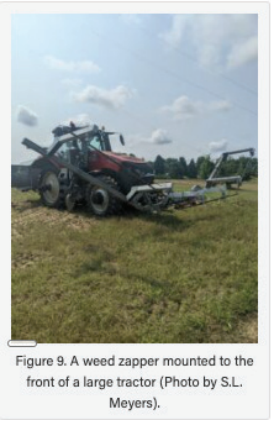


Figure 9. A weed zapper mounted to the front of a large tractor (Photo by S.L. Meyers).

BIOLOGICAL

Living Mulches

Living mulches are grown in tandem with a cash crop. These living mulches act as a natural barrier, reducing detrimental weed establishment and growth by competing for sunlight, water, and nutrients. This is most commonly used in row middles between plasticulture-grown vegetables. Other examples include clover planted between established corn. Another option is to allow neutral weed communities to establish alongside cash crops. Neutral weeds, by definition, do not compete with the cash crop for resources and do not have a negative impact on cash crop yield or quality.

Seed predation

Seed predation involves the consumption of weed seeds by natural predators, such as insects, birds, or rodents. By eating or biting weed seeds before they germinate, seed predators help to reduce the weed seed bank and seed viability in agricultural fields, ultimately decreasing weed pressure and population densities.

Livestock

Livestock, such as cattle, goats, sheep, or geese, can selectively consume certain weed species while grazing, decreasing weed biomass and seed production. Integrating livestock into crop rotations or grazing them in fallow fields can help control weeds.

Bioherbicides

Bioherbicides are naturally occurring substances derived from plants, microbes, or other organisms that suppress weed growth. One notable example is vinegar, a common household item that can effectively suppress weeds when applied in higher concentrations than those used for human consumption.

CHEMICAL (HERBICIDES)

Herbicides can be broadly categorized in many ways. Most function by disrupting the function of enzymes in susceptible plants. To learn more about what herbicides are registered for use in your crops, consult the Midwest Vegetable Production Guide (mwveguide.org).

Pre-emergence vs Post-emergence

Pre-emergence herbicides (also known as soil-applied or residual herbicides) are called “pre-emergence” herbicides because they are applied before weed seeds emerge. Most must be absorbed by weed seeds as they germinate. For this reason, pre-emergence herbicides must be “activated” by rainfall or overhead irrigation to move them into the top inch or so of soil where weed seeds actively germinate. Larger-seeded weeds can germinate from deeper in the soil profile and may not be controlled as effectively by pre-emergence herbicides. Post-emergence herbicides are applied to emerged weeds and can be either contact or system in their function.

Contact vs. Systemic Herbicides

Contact herbicides act upon direct contact with plant tissue, causing rapid desiccation or destruction. Although they may be taken into the leaves of a sprayed plant, they are not moved far throughout the plant. They are effective for rapid weed control of small, emerged weeds but may not provide long-lasting results, especially for perennial weeds. Systemic herbicides are absorbed by plants and moved throughout the vascular system, reaching and affecting areas beyond the point of application. These are more effective against larger and perennial weeds and provide longer-lasting control.

Selective or Non-Selective

Selective herbicides control some weeds and not others. For example, grass-selective herbicides, like clethodim, do not provide control of broadleaf weeds. Similarly, broadleaf herbicides like 2,4-D will not control grassy weeds. Non-selective (also known as broad-spectrum) herbicides are less picky about the weeds they control. These herbicides are often applied as a pre-plant burndown or row middle application with caution to avoid contacting the crop and include herbicides such as paraquat, glyphosate, and glufosinate.

in 2011. It may be the largest brood of cicadas in the country; its only rival being Brood 10, which some folks may remember emerging back in 2021. As a result of the combined emergence, there could be billions of cicadas singing, mating, and dying in the months of May and June.

What will you see in Kentucky?

Historically, Kentucky has been home to part of Brood 19, mainly in the Purchase and Pennyrile Regions of the state. According to Cicada Mania in the last emergence of Brood 19, the only confirmed reports of periodical cicadas in Kentucky were in Allen, Caldwell, Christian, and Trigg Counties. That doesn't mean that they are gone from all the other counties they were previously known in; it just means there needs to be more reporting.

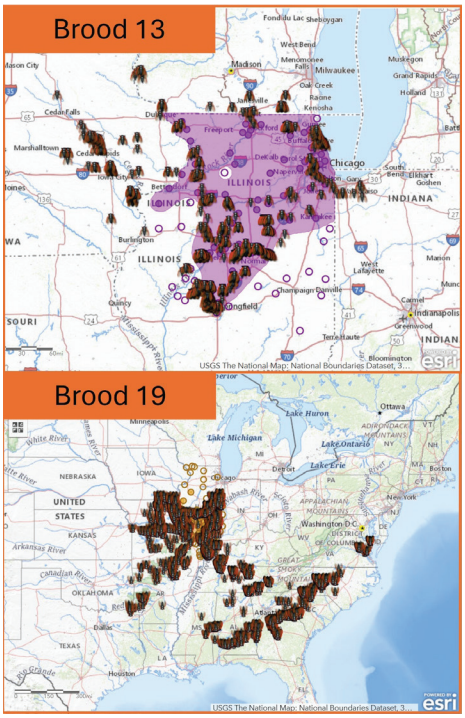
There is also a complicating factor for Kentucky during the "year of the dueling broods." Kentucky is on the calendar to have a massive emergence of its own in 2025. This is Brood 14, which covers most of Kentucky east of the Purchase Region. The complication is that sometimes cicadas miscount and emerge a year early or a year or more later. So, in theory, areas of Kentucky that aren't truly a part of the double brood emergence may still see cicadas this year.

Cicada-human Interactions

This is truly one of most amazing natural phenomena you can experience – a huge macabre Mardi Gras of insect song, mating, and death. These are some of the longest-lived insects in the world, and they can only be seen in the United States. It is understandable that some people don't like the idea of being around so many insects or like to listen to the cacophony they produce, but luckily, these insects are transient; they will be gone before you know it. Cicadas do not sting or bite and can be avoided by not going to wooded areas.

Cicadas are not broadly considered pests; they won't attack our most common crops or most ornamental plants. The exception is that periodical cicadas can cause damage to newly transplanted ornamental trees in the landscape and to fruit trees. This is a result of egg laying by the female who cuts slits into thin twigs to insert her eggs. Their preferred hosts include oak and hickory, as well as fruit trees like apple and pear. Large mature trees can handle egg laying, but young small trees may suffer.

Protecting these smaller trees can be done with "cicada netting," which is netting that has smaller gauge than bird netting. This can be placed on the tree when the males start to sing and removed by mid-June. Some people report success with wrapping tin foil around the trunks of small trees or using sticky tape to catch cicadas as they crawl up.



The two broods emerging this year are Brood 13 and Brood 19. The emergence will happen in pockets from southern Wisconsin down to Mississippi, Alabama, and Georgia. (Maps from UCONN Cicada Research).

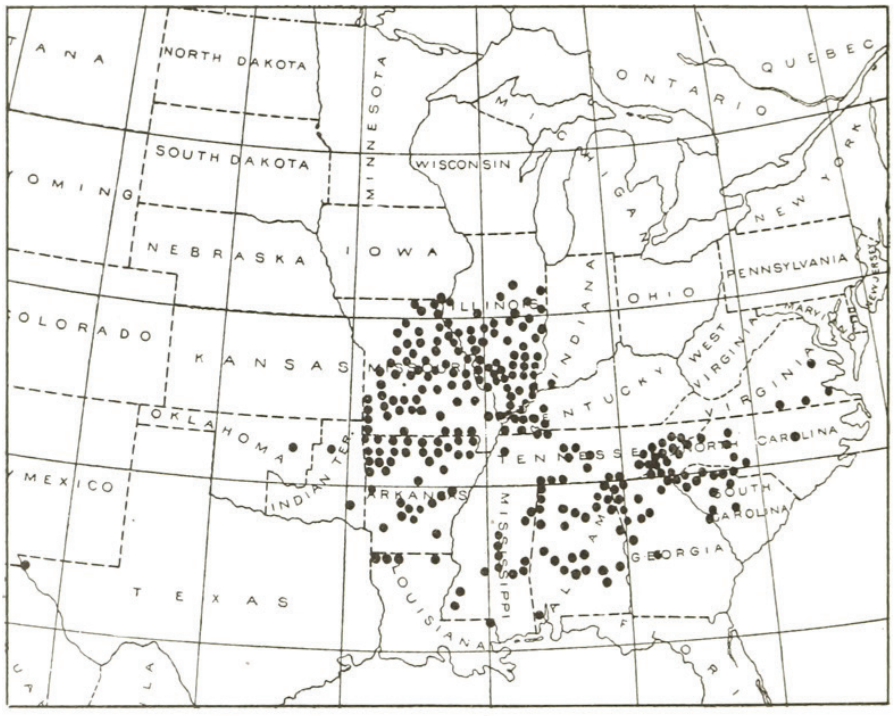


FIG. 22.—Map showing distribution of Brood XIX, 1907.

A map from 1907 that shows the historic range of Brood 19 and their location in Kentucky.