

Periodical Update: Cicada Observations and Educational Opportunities

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Periodical Cicada



Joe Boggs, OSU Extension©

The anticipated magical appearance of Brood X (10) of the 17-year periodical cicadas (*Magicicada* spp.) is getting closer with each day. On one hand, the cicadas are providing clear evidence they are nearly ready to take the stage en masse. On the other hand, progress has slowed to glacial speed owing to continual dips in springtime temperatures.



This is the second of what is anticipated to be a series of BYGL Alerts dedicated to Brood X happenings in Ohio, Indiana, and Kentucky. The first Alert was posted on April 1 (no joke intended!) and provided background information on the history, biology, and marginal management of the periodical cicadas. You can access that Alert by clicking this hotlink:

<https://bygl.osu.edu/node/1759>

Your Opportunities to Learn More

1. This Coming Wednesday, April 28 at 4:00 p.m. FREE

OSU Extension, Hamilton County, "*Periodical Cicada Brood X (10): Apocalyptic or Just Ho-Hum?*" taught by yours truly.

Presentation Description: "Brood X (10) of the 17-year periodical cicadas will emerge over a large swath of southwest Ohio this spring. Will it be as bad as some fear? Nothing to worry about? Or, somewhere in the middle? This presentation will focus on the identification, biology, and potential damage caused by these periodical visitors."

To register, click this hotlink:

https://osu.zoom.us/meeting/register/tJAlfu6ppj0qGNC5rf1fFFVzSWvxV2F2qr_z

2. This Coming Thursday, April 29 at 7 p.m.: FREE

Cincinnati Public Radio, WVXU, presents "*ZOOM: What Can We Learn From Cicadas?*" with Dr. Gene Kritsky, Kritsky (Dean of Behavioral and Natural Sciences and professor in the Department of Biology, Mount St. Joseph University, Cincinnati. Gene wrote the book on Brood X; literally! You can find his books on Amazon titled, "*Periodical Cicadas: The Plague and the Puzzle*," and "*Periodical Cicadas: The Brood X Edition: Black and White edition*."

To RSVP for his online presentation, click this hotlink:

<https://www.wvxu.org/post/zoom-what-can-we-learn-cicadas#stream/0>

3. Thursday, May 6 at 7:30 p.m.: \$10.00 Fee

Columbus Science Pub Presents, "Brood X Files" with Dr. Gene Kritsky. You can register for Gene's presentation by clicking this hotlink:

<https://mailchi.mp/shadowboxlive/brood-x-swarms-the-science-pub?e=b2e53e3429>

Your Opportunity to Contribute to Cicada Science

Much is known about periodical cicadas; however, there remain many unanswered questions. Specifically, the exact geographical distribution of Brood X including locations within the historical range needs to be further defined. Cicada populations are often highly localized with large concentrations commonly near areas with no cicadas. Future predictions depend heavily on where we do and don't see periodical cicadas this spring.

Gene Kritsky worked with the Center for IT Engagement at Mount St. Joseph to develop an easy-to-use smartphone mapping app titled *Cicada Safari*. The **free** app can be download from the Apple App Store or Google Play.

All you need to do is snap a picture then hit the submit button. Once your image is confirmed as being a periodical cicada (and not your cat), the latitude and longitude for your observation are added to the cicada map.

I strongly urge that you download the app and use it to help us learn more about Brood X. Become part of the Cicada Safari!

Click on the hotlink below to access the Cicada Safari website

<https://cicadasafari.org/> (<https://cicadasafari.org/>)

Cicada Safari

Smartphone mapping app



Join Cicada Safari to help map the 2021 emergence of the periodical cicada Brood X. Simply download the free app from the [Apple app store](#) or [Google play](#), then go on a safari to find periodical cicadas. Photograph and submit the periodical cicadas to Cicada Safari, and after the photos are verified, they will be posted to the live map. Cicada Safari was created by [Dr. Gene Kritsky](#) working with the [Center for IT Engagement](#) at [Mount St. Joseph University](#) in Cincinnati.

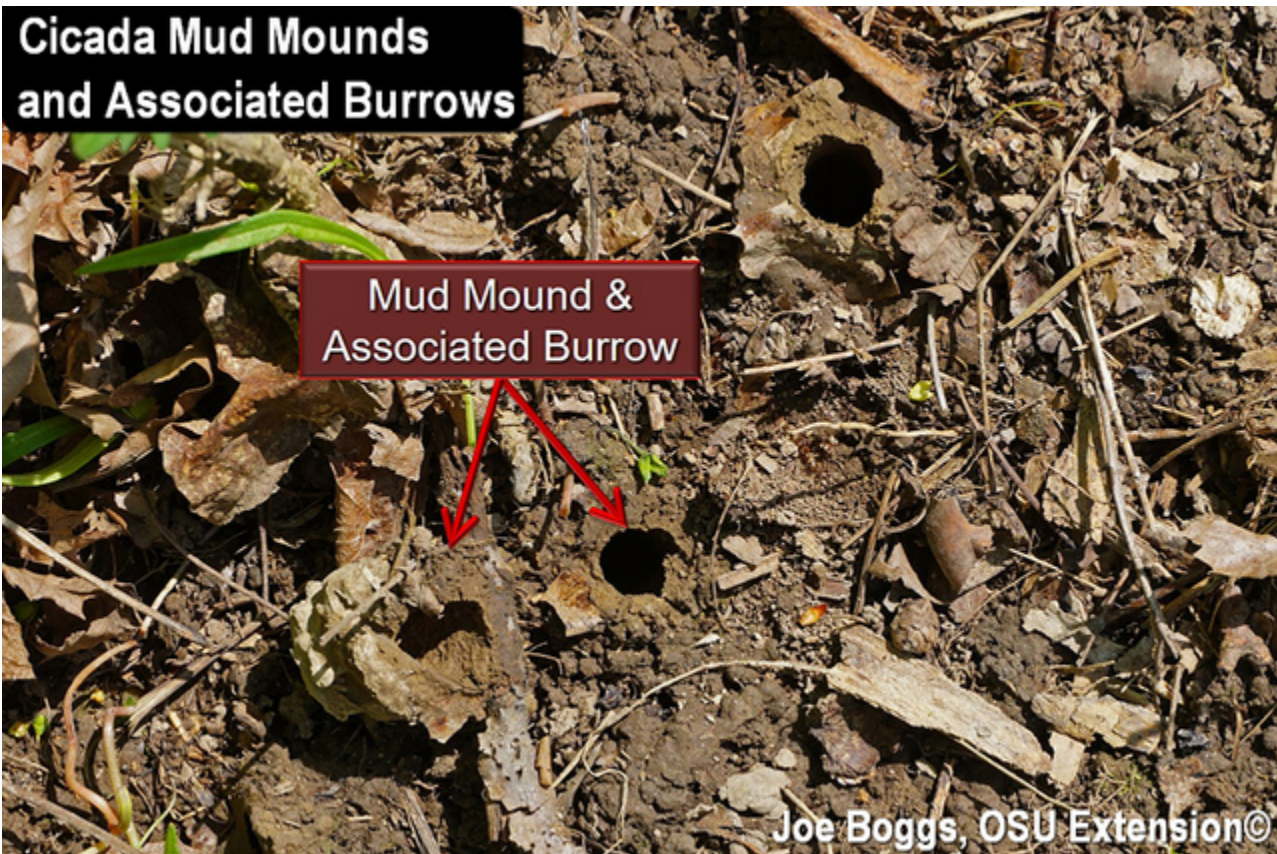
Cicada Observations and More Background Information

Mature cicada nymphs have been busy over the past few weeks creating vertical channels, often referred to as “burrows”, to provide easy access to the surface. The burrows are topped with hollow mud mounds that dry to become almost brick hard. The mounds may appear as round ball-like structures or elongated finger-like structures rising an inch or more above the soil surface. Removing them will reveal the entrance to the burrows. The mounds are sometimes referred to as “mud chimneys” although there is no hole until the cicadas emerge.

Cicada Mud Mounds



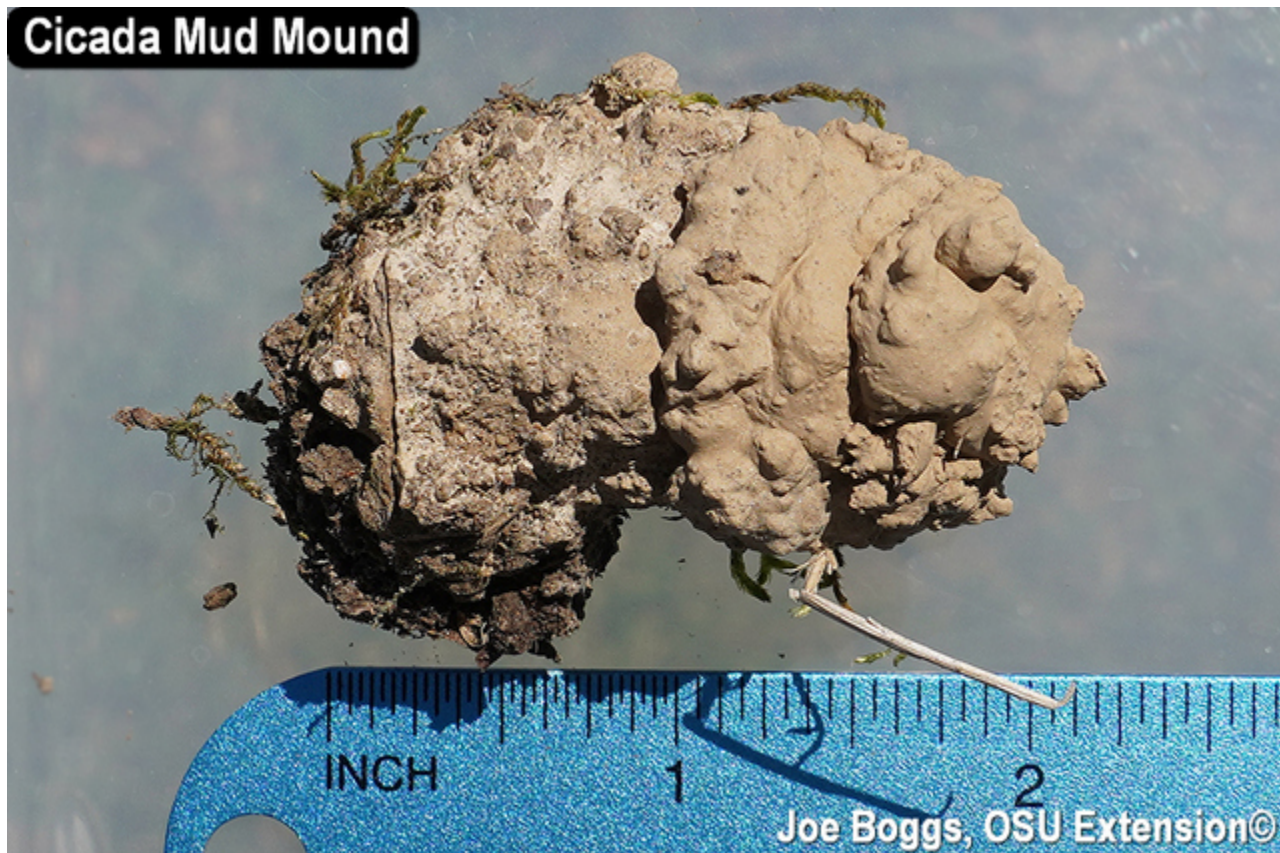
Cicada Mud Mounds and Associated Burrows



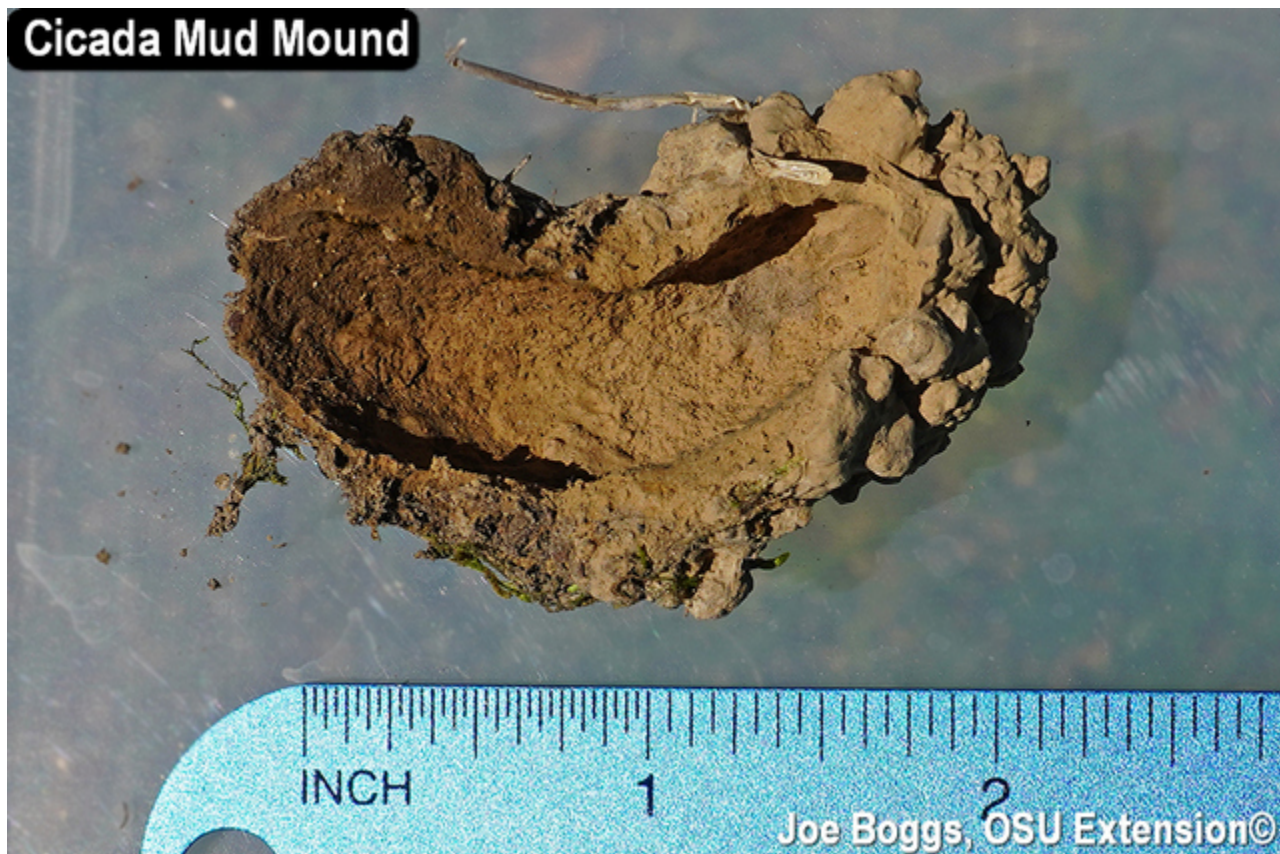
The mounds serve several purposes. The literature notes that the mounds are produced by the nymphs clearing wet soil from their burrows. Once the mud mounds harden, they protect the nymphs from stormwater cascading down the burrows. The hardened mud plugs may also help to maintain high humidity within the burrows making the

delicate nymphs less susceptible to dehydration. Finally, insect predators and parasitoids would need a miniature jackhammer to break through the hardened mud structures.

Cicada Mud Mound



Cicada Mud Mound



The mud structures are currently appearing in huge numbers in southwest Ohio revealing where we can expect large numbers of cicadas to eventually burst forth. The mounds are easy to spot rising from bare soil; however, you can find them beneath leaves or in turfgrass using the “crunch test.” The hardened structures make a crunching sound when you walk on them.



The eyes of the cicada nymphs I've recently excavated beneath the mud structures are turning red, the same eye color of the adults. However, they lack black patches on their upper thorax just behind their head which is a tell-tale sign the nymphs are ready to climb to the surface to face the world. The “nymphs” that climb from the soil are actually adults wrapped in the exoskeletons of the last instar nymphs.

Late Instar Cicada Nymphs



Life in a Suit of Armor

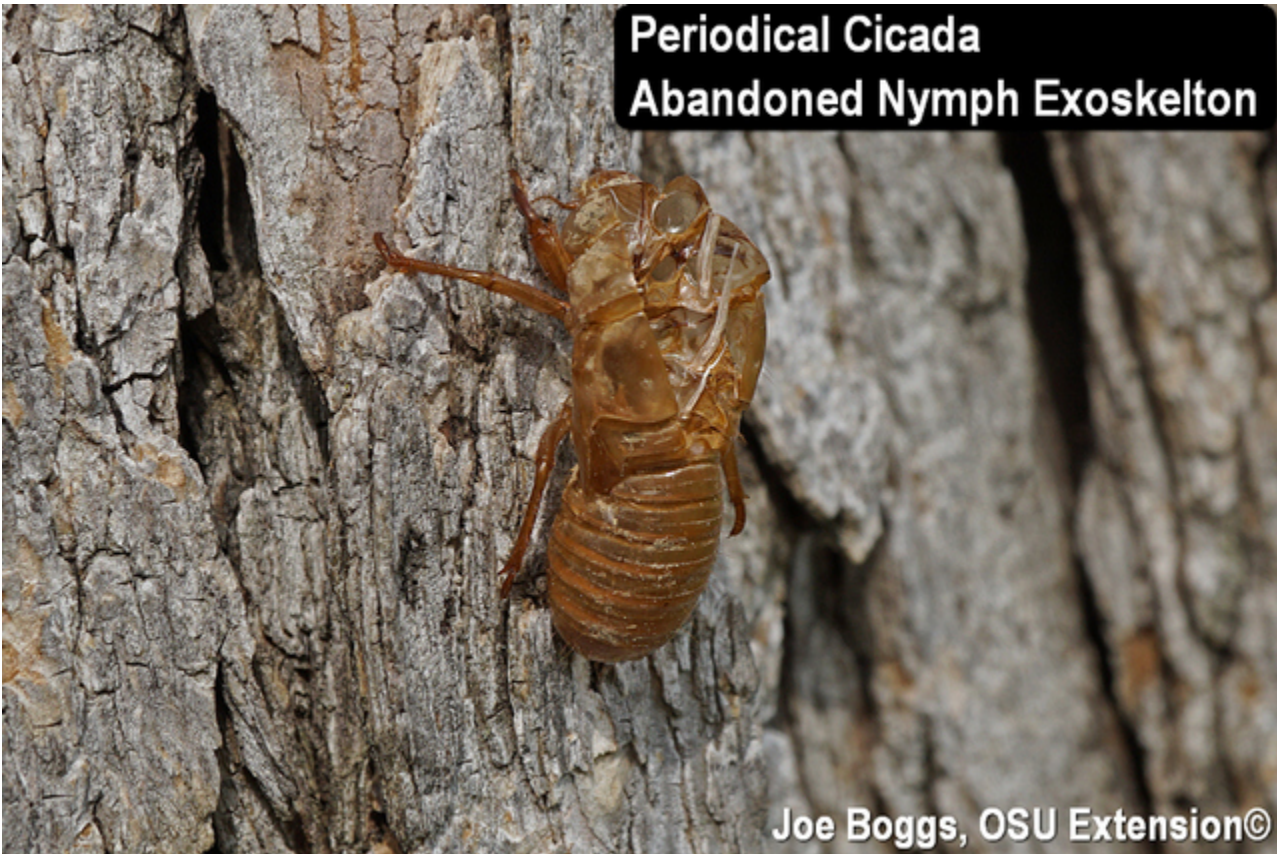
There are a couple of things to keep in mind regarding cicada development. First, as with all insects, they have an exoskeleton. Everything inside is held inside by the hard “skeleton” on the outside (= **exoskeleton**). Most animals that we’re familiar with, including ourselves, have **endoskeletons**. This includes everything from elephants to alligators and all birds except boneless chicken.

Buckeye Periodical Cicada Abandoned Nymph Exoskeltons



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Periodical Cicada Abandoned Nymph Exoskelton



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However, an exoskeleton is like a suit of armor; it must be shed each time an immature insect gets larger. Butterflies and bees develop from eggs to adults through *complete metamorphosis* (= change in form). The eggs hatch into the larval stage (larva – singular; larvae plural) that develop in a stepwise progression through different “instars.” We say the larvae mature to a new instar stage each time they shed (molt) their exoskeleton to

accommodate their larger size. Eventually, they molt into the pupal (pupa – singular; pupae – plural) stage during which a complete change occurs from larvae (e.g., caterpillars for butterflies) to adults.

Cicadas develop from eggs to adults through *incomplete metamorphosis*. I've never liked this name because it sounds like the outcome could be something horrible. Something like cicadas emerging with two heads.



Periodical cicadas take 13 or 17 years, depending on the brood, for the nymphs to occasionally shed (molt) their previous exoskeleton to acquire a larger suit of armor to accommodate their larger size. They enter a new "*instar*" stage each time they molt. However, there is no pupal stage with incomplete metamorphosis. Adults emerge from the exoskeleton of the last instar nymph.

**Periodical Cicada
Emerging from
Last Instar Nymph Skin**



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**Newly Emerged Periodical Cicada
with Nymph Exoskeleton**



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The timing of the emergence is based on temperature because cicadas, like all insects, are cold-blooded. Their body temperature is the same as their surroundings which affects the speed of their metabolism: lower means slower. Periodical cicadas start climbing from the soil en masse when the soil temperature tops 64° F.

Cicada Exit Holes



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**Newly Emerged Periodical Cicada
with Nymph Exoskeleton**



Joe Boggs, OSU Extension©

Periodical Cicada



Our recent downturn in air temperature has slowed the rise in soil temperature meaning the cicada emergence has no doubt slowed to a crawl. However, the timing for the emergence should get back on track with predicted summer-like temperatures on the horizon.

What to Expect

Brood X includes three species: *Magicicada septendecim*, *M. cassini* (= *cassinii*), and *M. septendecula*. These species are typically asynchronous in their emergence. Thus, there may be an observable rise and fall in the number of cicadas clambering around Ohio's forests and landscapes as the different species emerge

Predicting exactly *when* the cicada emergence will get underway has been a challenge. It's also difficult to predict exactly *where* the cicadas will appear in large numbers.

However, here are some basic considerations that landowners can apply to determine if a cicada mob will appear in their landscapes.

1. Look at the "Big Map." The University of Connecticut's website titled, "Cicada" includes a map that incorporates all of the historical records for Brood X. You can access the map by clicking this hotlink:

https://cicadas.uconn.edu/brood_10/

2. Did cicadas appear in your landscape in 2004? There remains some uncertainty regarding how far cicadas will fly to infiltrate new territory; however, based on past observations, they seem to stay within the locations where they emerged. So, if you saw cicadas in 2004, you'll most likely see them again this spring. Of course, memories can be flawed and Brood X overlaps the geographical range for Brood XIV (14) which emerged in 2008; mark 2025 for a repeat!

3. The Tree Connection. Periodical cicada nymphs feed on tree roots so cicadas have an obligate connection to trees; specifically deciduous hardwoods. They may also feed on woody shrubs, but trees are their bread and butter.

High-Risk Landscape



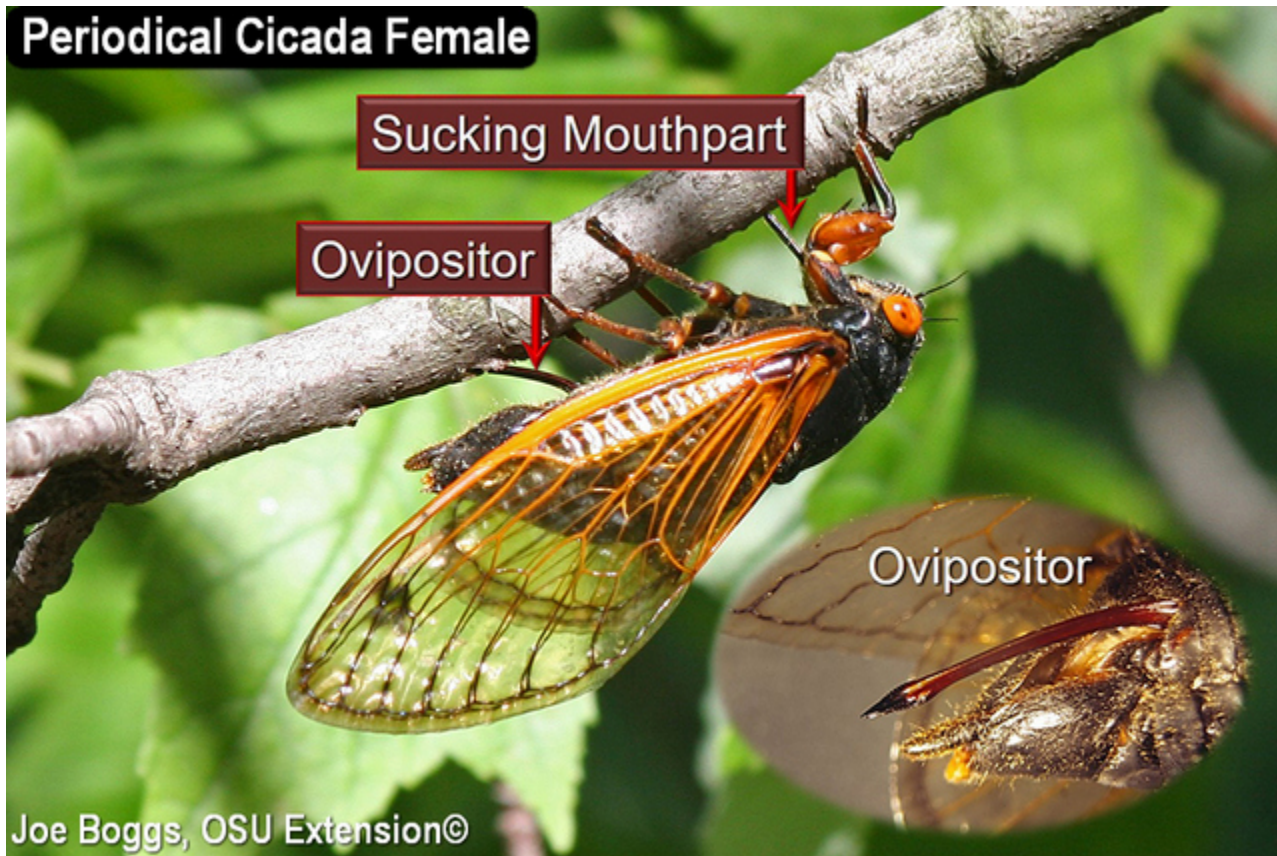
If your home was built on land that was a crop field, periodical cicadas didn't become established. If you live in a housing development that was carved out of a forest, but the soil was extensively excavated and moved around, it's likely the cicadas were destroyed. Periodical cicadas must have trees and they typically don't fly far from the trees from which they developed.

No-Risk Landscape



A Word About Mismanagement

Insecticides are not generally effective against periodical cicadas. They are sucking insects meaning they won't consume insecticides applied topically to stems and foliage and they are large insects requiring a high dosage. Also, topical insecticides may kill beneficial insects important for keeping other pests in check. A cicada application this spring may translate into dealing with more serious pests later in the season.



Periodical cicadas focus their attention on deciduous hardwoods; they are not a conifer pest. Although desperate cicada females may be observed oviposition on a wide range of non-preferred hosts including pines, the result does not bode well for the nymphs. We can only imagine nymphs muttering, "what was mom thinking?" as they try to free themselves from sticky pine resin.

Keep in mind that periodical cicadas co-evolved with their hardwood hosts. They are not tree-killers. Their oviposition damage to established trees is minimal. In most cases, attempts at management are not necessary.

Periodical Cicada Oviposition Slits



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Flagging on Oak Mid-July



Joe Boggs, OSU Extension©

On the other hand, fruit trees and newly transplanted landscape trees may need to be protected from oviposition damage using tree wrapping. However, it's important to use appropriate protective materials and proper application methods; improper tree wrapping can cause more damage than cicadas!

Cicada Damage on Recently Planted Trees



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Here are a few tips on the proper use of tree wrapping:

1. Tree wrapping **should only be used if there is a clear and present danger of branch damage from the cicadas**. It should be delayed until you see the red of the cicada's eyes and removed as soon as the cicada threat is no longer a concern. That's because tree wrapping confines new growth and may cause long-term branch distortion.

Tree Netting with Clear and Present Cicada Danger



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2. **Use nylon netting** with a mesh size no larger than 1/2 inches. The netting allows sunlight to penetrate the canopy and good airflow which supports canopy drying. Lightly drape the netting over the canopy; don't pull the netting tightly to constrict the canopy. This will lessen the potential for causing long-term branch distortion by restricting the new growth. The following images show a good application of nylon netting.

Cicada Tree Netting



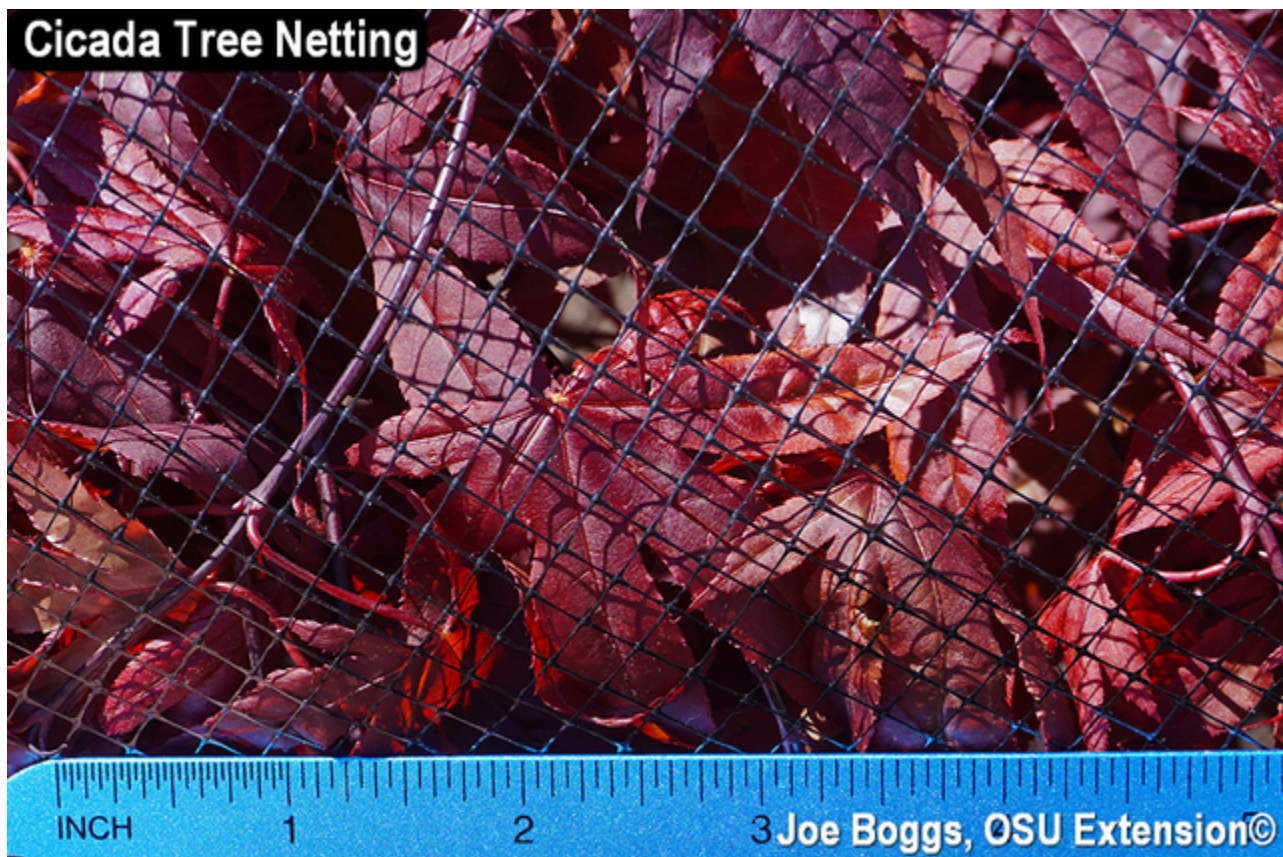
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Cicada Tree Netting

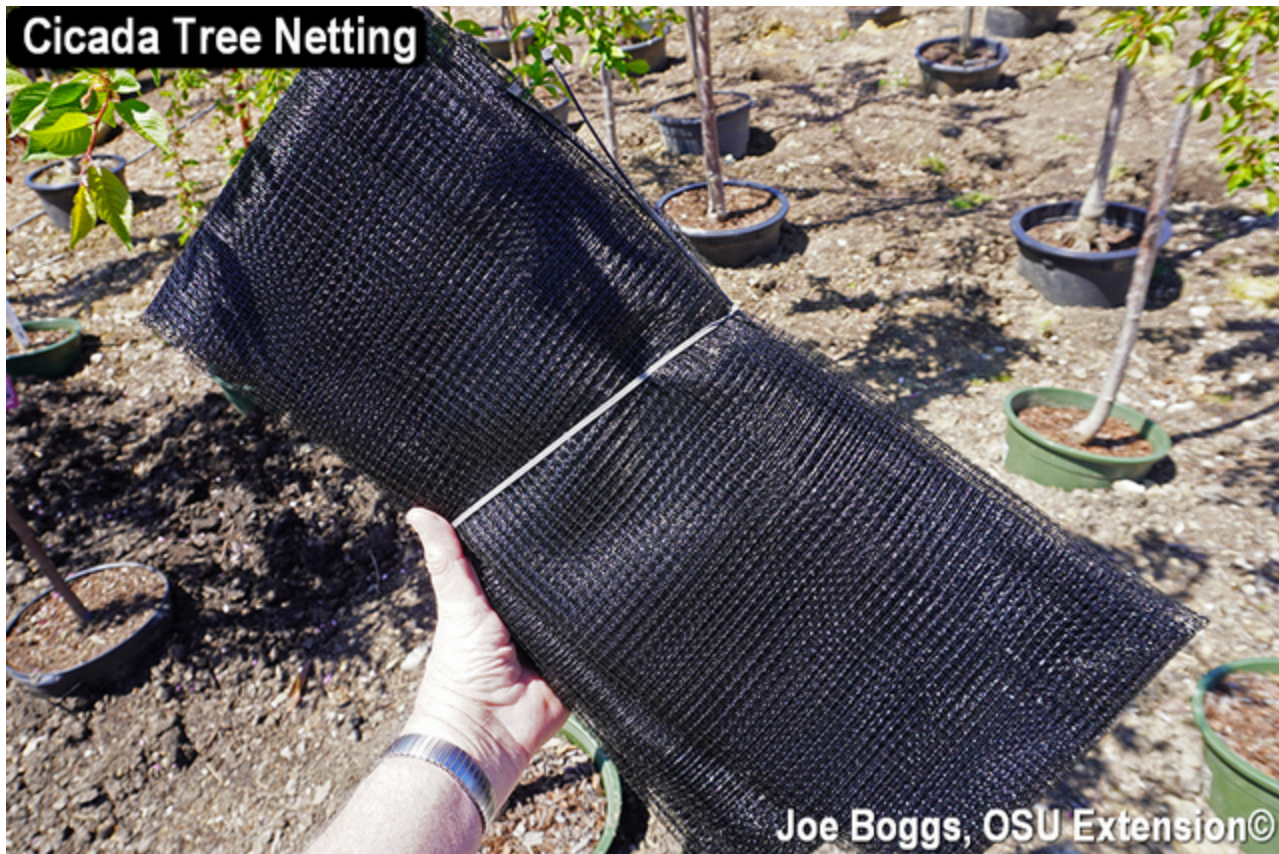


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Cicada Tree Netting



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3. Do not use tightly woven cloth such as bed sheets or fabric used for **plant row covers** such as the wrapping shown in the images below. Floating row covers are designed for crops, not trees. Cloth covers not only present a higher risk for distorting new growth, but the fabric can chafe the bark on tender new shoots producing long-term canker-like damage. Also, the fabric restricts air movement keeping the foliage moist to produce a microenvironment conducive to foliar disease development.

Fabric Tree Wrapping



cicada

17-year cicada

Magicalcicada

Periodical Cicada

Brood X