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Periodical Cicadas in Kentucky

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Periodical cicadas are important to those who work with orchards, nurseries, and some horticultural products because these insects can seriously damage fruit-bearing and woody ornamental plants.

Cicadas are relatively large, distinctive insects with clear wings that are held rooflike over the body. Adults are strong fliers that usually stay near the tops of trees. There are several species in Kentucky. All appear to have life cycles that take several years. The name periodical cicada is used for those in which spectacular adult emergences, or "broods," occur at predictable (13-year or 17-year) intervals. Each brood is designated by a Roman numeral. There are twelve 17-year broods, mostly in the northen states, and three 13-year broods, mostly in the South and Midwest. Most cicada species are not periodical. This means that some adults emerge from the soil almost every year.

Description

Although the periodical cicada and the annual cicada, or "dog day" cicada, resemble each other, they can be easily distinguished by their physical characteristics and by their appearance at different times of the year. The following table gives some easy ways to differentiate these insects.

Table 1. Characteristics for distinguishing periodical and annual cicadas.

Characteristic	Periodical Cicada	Annual Cicada
Size	1 ½"	2 to 2 ½"
Eye color	Red	Green
Wing color	Clear with orange veins	Clear with green veins
Body color	Black	Green to black
Leg color	Orange	Same as body
Mouthparts	Piercing-sucking	Piercing-sucking
Time of appearance	April-June	July-Sept

Damage

There are two aspects of periodical cicada damage. The most obvious occurs as females lay their eggs in small branches. A second, delayed effect can occur as the nymphs feed on sap that they remove from the roots during their long life below ground.

Egg-laying injury occurs when female cicadas slit the bark on pencil-sized twigs and lay their eggs inside the wounds. This results in "flagging," or breaking of peripheral twigs on small trees or shrubs. It is best to avoid planting young orchards or significant numbers of nursery or landscape trees and shrubs in the face of an impending periodical cicada emergence because of the severe injury these insects can inflict and the lack of effective control measures. Branch breakage from egg-laying wounds can ruin the shape and aesthetic appeal of ornamentals and result in possible plant death. On the other hand, established trees and shrubs are often able to recover from this striking but temporary disfigurement without apparent long-term effects.

Cicada damage can easily destroy the current year's growth, so increased pruning is required to get rid of damaged areas. The most serious consequence for nursery plantings will be the injury to usable living branches that provide the basic structure for the plant. These wounds cause a weak point so branches that are gathered together and tied during harvest and shipment are broken very easily. In order to have quality trees to harvest in a production nursery, a producer may have to remove one to two years of growth in order to develop usable branches on a finished product. This may mean that the trees near the end of their production cycle may be rendered useless as a marketable crop during the fall after emergence or during the next year.

Belowground feeding by large numbers of nymphs can cause long-term damage. Once the nymphs have burrowed into the ground and reached the roots, no control method is available. During the first five years, feeding by the nymphs probably will not be noticeable. However, for years 6 to 13 of the life cycle, nymphs may be extremely destructive to plants, especially those that bear fruit. In general, cicada damage will not be of any importance on fully grown shade trees, although the current year's growth may be reduced.

Control

Because egg laying is the real danger from these insects, consider emergence as the signal to begin protecting plants. A week or so after emergence, females are ready to lay eggs. Plants can be protected in three ways: covering, spraying, and pruning.

Small trees can be covered with a protective netting like cheesecloth. Be sure to secure the bottom around the trunk to prevent the insects from crawling up from below. This covering will have to stay on for the next four to six weeks or until egg laying is complete.

Insecticides can be used to reduce damage by cicadas, but several applications may be needed. Dursban (chlorpyrifos) and Sevin (carbaryl) are labeled specifically for periodical cicada control. Several synthetic pyrethroid insecticides are labeled for landscape trees and shrubs. Often, these insecticides have a repellent effect that causes insects to leave treated surfaces shortly after landing on them. The following examples do not list the periodical cicada but are broad-spectrum products that are effective against a wide range of insects: Astro (permethrin), Decathlon 20 WP or Tempo (cyfluthrin), DeltaGard T&O (deltamethrin), and Scimitar (*lambda* cyhalothrin). Several of these are available only to commercial applicators.

Nurseries under a routine spray schedule should be sprayed according to the intensity of the outbreak, which can range from a few cicadas in some areas to massive numbers in other areas. During low-level outbreaks, twice-a-week applications may be needed. During massive outbreaks, damage will potentially occur even with daily applications. Continued cicada flight to landscapes and nurseries from surrounding woods keeps reinfestation pressure high for several weeks. Control is most effective when the insects are hit directly with spray droplets. Residual control must rely on cicadas sitting on treated surfaces long enough to absorb the insecticide. This can delay or reduce action on the insect.

The following are some of the products available to homeowners: Lawn and Garden Insect Killer (cyfluthrin) and Ortho Bug B Gone Spray (esfenvalerate). Spectracide Bug Stop Multipurpose Insect Control Concentrate and Total Pest Control Outdoor Formula contain permethrin. Be sure to read the product label closely because many of these products are not labeled for fruiting plants and trees that are bearing.

A third alternative is to prune out egg-laying wounds before eggs hatch, especially in fruit orchards where juveniles feeding on roots may decrease fruit production. Although this is a time-consuming process, it may be a viable alternative considering the production life and long-term value of fruit trees.

Distribution in Kentucky

Nine of the periodical cicada broods are known to inhabit Kentucky. Some are found in only a single county, while two are almost statewide.

Table 2. Emergence of Kentucky periodic cicada broods through the year 2017.

Year of occurrence	Brood	Cycle	General location
2002	XXIII	13 yr	West of I-65
2003	IX	17 yr	Possibly Pike County
2004	X	17 yr	Statewide
2007	XIII	17 yr	Possibly scattered
2008	XIV	17 yr	Statewide (except Purchase and possibly Pennyrile)
2011	XIX	13 yr	Purchase, Pennyrile, Green River
2012	I	17 yr	Possibly Harlan, Letcher, Martin, and Pike counties
2016	V	17 yr	Boyd, Greenup, and Lawrence
2017	VI	17 yr	Possibly Letcher County

Life Cycle

The individual life cycle of the periodical cicada is long but relatively simple. Adults usually emerge between late April and early June. Just before emergence, cicadas burrow to the soil surface and, if in water-soaked ground, they will often build a 6" to 8" tall mud "chimney," a structure very similar to those built by crayfish on water-soaked ground. This structure probably allows the cicadas to climb above the moist ground so their outer skin can dry out and be shed.

Following emergence, adults move immediately to any convenient vertical object and shed their last nymphal skin. They leave empty brown skins, which have split down the back, lying all about. After struggling out of the pupal skin, adult cicadas rest on that site for several hours until their bodies and wings have expanded and are dry and hard.

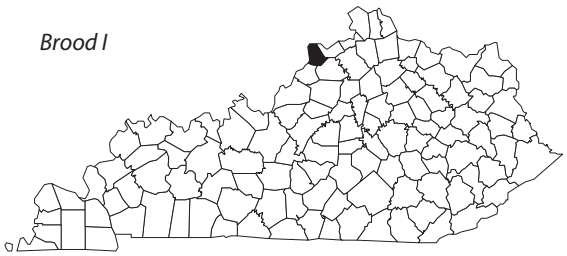
After mating, females disperse to lay eggs. They prefer grapevines and oak, hickory, apple, peach, and pear trees for egg-laying. They first slit the bark and then insert a row of eggs into the wound. Eggs hatch in six to eight weeks. Nymphs fall to the ground and burrow down to the root system where they stay for the next 13 (or 17) years. Damage occurs as they use their piercing-sucking mouthparts to feed on sap in the roots.

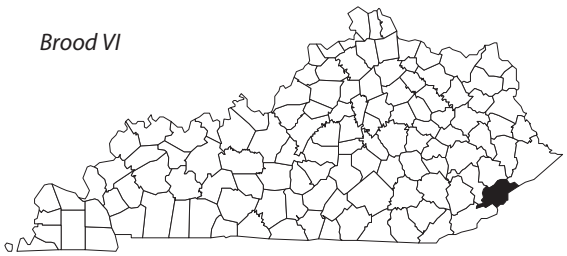
Name Confusion and Myths

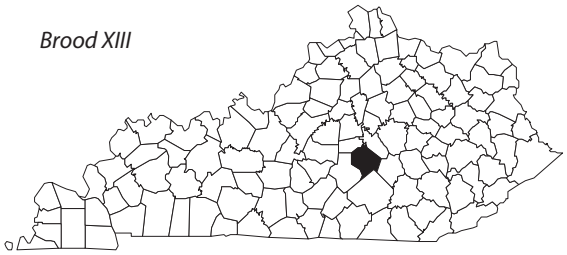
Confusion and myths about the periodical cicada abound. Cicadas are sometimes confused with closely related species, as well as with those that are totally unrelated. Some misinformation may stem from incorrect assumptions made by early settlers. Most of them had never seen insects that appeared overnight in massive numbers, but they had read Biblical accounts of hordes of grasshoppers or locusts that descended on Egypt during the time of Moses. They assumed that the massive outbreaks of periodical cicada were the same as those ancient hordes. To this day, many people refer to the periodical cicada as the 17-year locust. In fact, the two are not even remotely related.

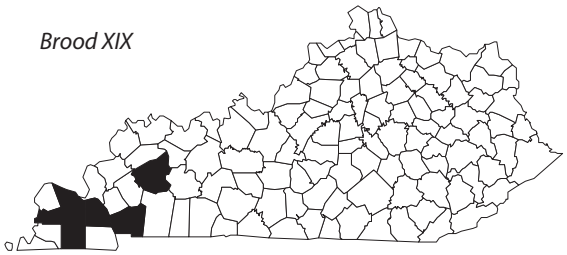
To most Kentuckians, a brood emergence is no more than an interesting curiosity or temporary annoyance. While the mass emergence itself is striking, the racket produced by these insects also is impressive. Cicadas are the loudest of insects. Their sound comes from specialized abdominal structures called tymbals, usually present only on the males. The calls primarily are used to find females, but an "alarm" noise is produced if a cicada is caught. Cicadas cannot sting and are not known to carry diseases.

Apparently the long life cycles and synchronized emergences of periodical cicadas allow them to escape natural control by predators that range from birds to spiders to snakes. In emergence years, cicada numbers are so high that predators apparently can eat all they want without significantly reducing the population. Consequently, predators cannot build up in response because these cicadas are available as food only once every 13 or 17 years.









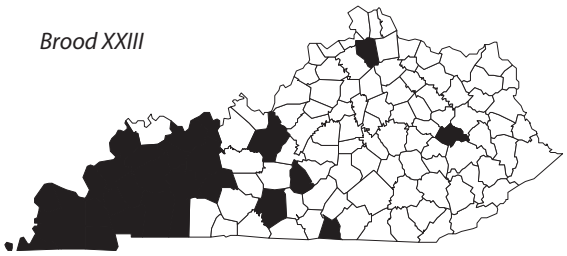


Table 3. Kentucky Distribution of Periodical Cicada

Brood	Counties
I	Trimble.
VI	Letcher.
X	Allen, Anderson, Barren, Bath, Bell, Boone, Boyd, Breckinridge, Butler, Caldwell, Campbell, Carroll, Carter, Casey, Christian, Clay, Clinton, Crittenden, Cumberland, Daviess, Edmonson, Fayette, Fleming, Franklin, Gallatin, Garrard, Grant, Grayson, Green, Greenup, Hancock, Hardin, Harrison, Hart, Henderson, Hickman, Hopkins, Jefferson, Johnson, Kenton, Knox, Larue, Laurel, Lawrence, Lee, Leslie, Letcher, Lewis, Lincoln, Livingston, McLean, Madison, Magoffin, Martin, Meade, Mercer, Monroe, Nelson, Nicholas, Ohio, Oldham, Owen, Owsley, Pendleton, Pike, Scott, Shelby, Trigg, Trimble, Union, Warren, Washington, Wayne, Webster, Whitley, Wolfe.
XIII	Lincoln.
XIV	Adair, Allen, Anderson, Barren, Bath, Bourbon, Boyd, Boyle, Breckinridge, Bullitt, Carter, Casey, Clark, Clinton, Cumberland, Edmonson, Estill, Fayette, Fleming, Floyd, Franklin, Garrard, Grayson, Green, Greenup, Hancock, Hardin, Harrison, Hart, Henry, Jackson, Jefferson, Jessamine, Johnson, Knott, Knox, Larue, Laurel, Lawrence, Lee, Lewis, Lincoln, Logan, McLean, Madison, Magoffin, Martin, Mason, Meade, Menifee, Mercer, Metcalfe, Monroe, Montgomery, Nelson, Nicholas, Owen, Owsley, Pendleton, Perry, Pike, Powell, Pulaski, Rockcastle, Rowan, Russell, Scott, Shelby, Simpson, Taylor, Trimble, Warren, Wayne, Whitley, Wolfe.
XIX	Carlisle, Graves, Hopkins, McCracken, Marshall, Trigg.
XXIII	Ballard, Barren, Butler, Caldwell, Calloway, Carlisle, Christian, Clinton, Crittenden, Daviess, Fulton, Grant, Graves, Green, Hancock, Hardin, Hickman, Hopkins, Livingston, Lyon, McCracken, McLean, Marshall, Muhlenberg, Ohio, Todd, Trigg, Union, Webster, Wolfe.

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