

## PERIODICAL CICADAS IN KENTUCKY

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Cicadas are distinctive insects with sucking mouthparts and two pairs of clear wings that are held roof-like over the body. They tend to stay in the tops of trees so we usually hear these noisy insects more than we see them. Several cicada species occur in Kentucky and all spend most of their multi-year life cycle underground where the immature stages feed on sap from tree roots.

Periodical cicadas are those that have spectacular adult emergences, or "broods", which occur at predictable (13-year or 17-year) intervals. There are twelve 17-year broods, most in the northern states. Three 13-year broods occur mostly in the south and midwest. Broods are designated by Roman numerals. Most cicada species are not periodical so some adult cicadas can be seen every year. The adults are out for 2 to 6 weeks to mate and lay eggs, then they die. Periodical cicadas can cause significant injury to trees in orchards and nurseries, brambles and woody ornamental plants.

To most Kentuckians, a brood emergence is no more than an interesting curiosity or temporary nuisance. They cannot sting and are not known to carry any plant diseases. While the mass emergence is striking, the racket produced by these insects also is impressive. Cicadas are the loudest of insects. Males produce their sounds with specialized abdominal structures called tymbals. The calls primarily are used to attract females but an "alarm" noise is produced if a cicada is caught. 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 can be 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.

### Description

The periodical cicada and annual cicada are confused because of their superficial similarities but they can be easily distinguished. A table below gives some comparative characteristics that make it easy to distinguish them from insects with which they are most often confused. Also, they also appear at different times

of the year.

### Distinguishing Periodical & Annual Cicadas

Characteristic	PERIODICAL CICADA	ANNUAL CICADA
Body Size	1-1/2"	2 to 2 1/2"
Eye Color	Red	Green
Wing Color	Clear with orange veins	Clear with green veins
Body Color	Black	Green to black
Leg Color	Orange	Black
Time of appearance	April to June	July to September

### Life Cycle

The 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 will often build a 6" to 8" tall mud "chimney," a structure very similar to those built by crayfish. 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.

### Damage

The numbers of periodical cicadas flying about during a brood emergence can vary widely. They will be most abundant around forests, woodlots, or urban areas with many mature trees. Periodical cicadas are not good fliers so they tend to stay within about 150 yards of the woods from which they emerged. Cicadas prefer oaks but can select other deciduous trees or woody ornamentals in which to lay eggs. They will not bother pines.

Cicadas can damage woody plants in two major ways: 1) The physical injury inflicted as females lay their eggs can cause "flagging," or breaking of peripheral twigs. Mature trees and shrubs usually survive even dense emergences of cicadas without apparent distress. This can be difficult to believe in the month or so following a large emergence when many deciduous trees turn brown due to the breakage and death of peripheral twigs. Such damage is apparently minor. However, orchard and nursery owners may want to avoid planting young trees or shrubs in the years preceding an emergence of periodical cicadas, because young trees may be harmed by severe flagging. This damage can easily destroy the current year's growth and require extensive pruning to remove damaged areas.

2) A more subtle and delayed physiological stress can develop as the underground nymphal stages remove sap from plant roots. Juvenile feeding causes the most long-term damage. Once nymphs burrow into the ground and reach the roots, no control method is available. Feeding by the nymphs during the first five years after brood emergence probably will not have a noticeable effect on the tree. However, sap removal during years 6 to 13 (or 17) 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

It is very difficult to protect trees and ornamentals from damage in area where cicadas are very abundant. It may be possible to protect a limited number of small tree. Adult emergence is the signal to begin watching for cicada activity and getting ready to protect plants, if necessary. Females are ready to lay eggs about three weeks after emergence so there is time to assess the need to protect trees.

Plants can be protected in three ways: covering, spraying and pruning.

Small trees can be covered with a protective netting cheesecloth. Be sure to secure the bottom around the trunk. This covering will have to stay on for four to six

weeks or until egg laying is complete. This can affect growth.

Insecticide may offer limited protection. Orchards and nurseries under a routine spray schedule may need to be sprayed more frequently during the cicadas' peak activity period. Spray requirements will vary according to intensity of the outbreak, which range from a few cicadas in some areas to massive numbers of the insect in other areas.

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 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.

The following products are examples available to homeowners: Lawn and Garden Insect Killer (cyfluthrin), 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.

### Brood 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.

#### Emergence of Kentucky Periodic Cicada Broods through the Year 2017.

Year	Brood	Cycle years	General Location
2002	XXIII	13	West of I-65
2003	IX	17	Possibly Pike Co.
2004	X	17	Statewide
2007	XIII	17	Possibly Scattered

2008	XIV	17	Statewide (except Purchase and possibly Pennyrile)
2011	XIX	13	Purchase, Pennyrile, Green River
2012	I	17	Possibly Harlan, Letcher, Martin and Pike Co.
2016	V	17	Boyd, Greenup, and Lawrence
2017	VI	17	Possibly Letcher Co.

### **Confusion and Common Name**

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 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.

### **Additional Reading**

Hyslop, J. A. 1935. The Periodical Cicada. USDA Bull. E-364.

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Stannard, Jr., L. J. 1975. The distribution of periodical cicadas in Illinois. Biol. Notes #91. Il. Nat. Hist. Surv. Urbana, IL

[www.ummz.lsa.umich.edu/magicicada/Periodical/Index.html](http://www.ummz.lsa.umich.edu/magicicada/Periodical/Index.html)

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