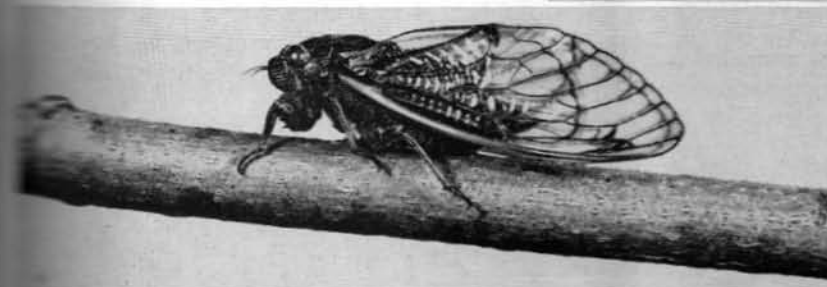
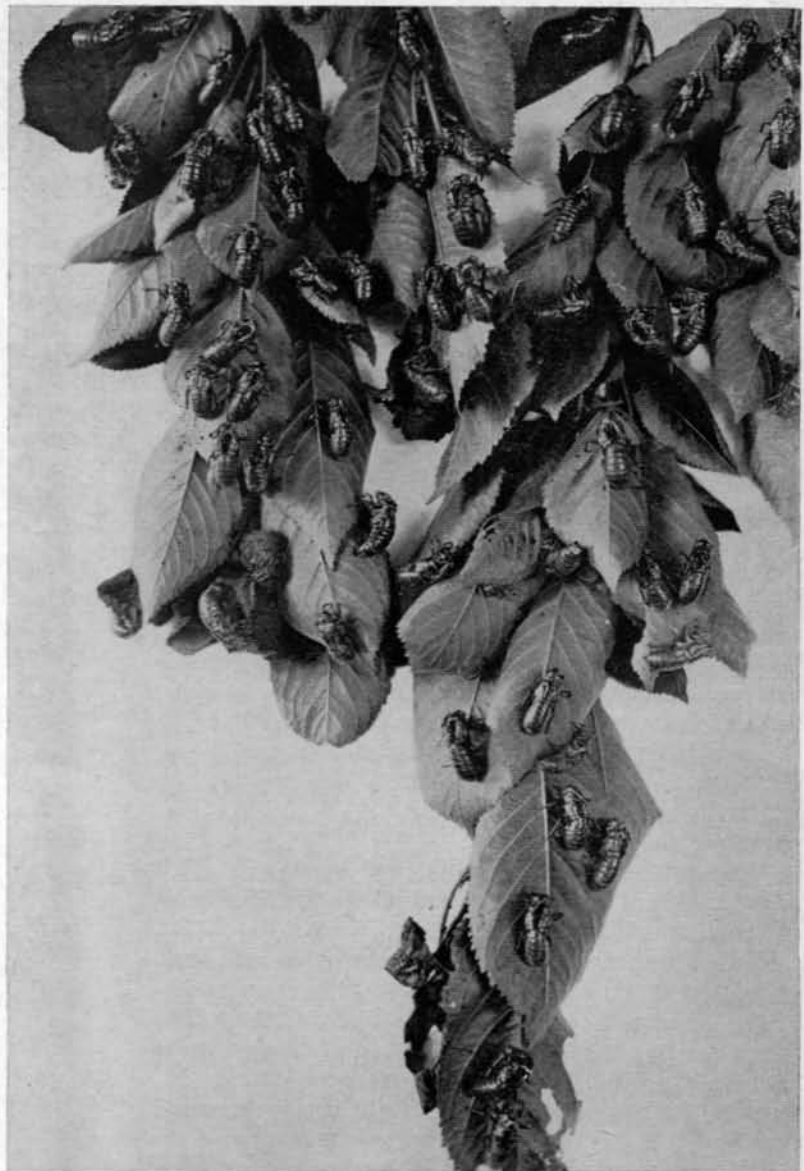


Right - Empty cast skins of 17-year locusts.
Below - Adult periodical cicada or 17-year locust, *Magicada septendecim*. Both photos courtesy U.S. Department of Agriculture, Bureau of Entomology and Plant Quarantine.



EXAMINED & CHECKLISTED

The Periodical Cicada In Pennsylvania Orchards

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The Periodical Cicada In Pennsylvania Orchards

DEAN ASQUITH†

THE PERIODICAL CICADA, commonly called the 17-year locust, is a serious pest of fruit and woodland trees in Pennsylvania. During their short period of activity, about 30 to 40 days, adult females injure trees by making punctures in the bark of twigs and small limbs to serve as "nests" for their eggs, fig. 1. Several thousand punctures may be slit in the bark of a single tree. In 1936, Cory and Knight (2) cut down an oak tree 33 feet in height with a limb spread of 13 feet and found 5,505 fresh cicada egg punctures in the bark.

In late May or early June of 1953 full-grown nymphs of Brood X, the largest brood of periodical cicadas in Pennsylvania, will emerge from the ground to transform into adults, fig. 2. In 1936, these nymphs hatched from eggs in punctures, such as the one illustrated in figure 1, and dropped to the ground. They burrowed into the soil and secured food by sucking sap from the roots of trees during the intervening period of their development.

The number of cicadas that will appear in 1953 will vary from location to location in the 35 Pennsylvania counties that are infested with Brood X, table 1. In an apple orchard in Adams county that was severely attacked by Brood X in 1936, an estimate of the number of nymphs in the soil was made by digging samples at scattered points in the orchard during July 1952. Nymphs were recovered from 18 samples, each measuring 2 feet by 2 feet on the surface and 9 inches in depth. The average number of cicada nymphs found was 30.56 per sample or 7.64 to the square foot of soil surface. These figures represent an average population of 332,798.4 nymphs per acre. This is less than one-tenth the population of 84 cicadas per square foot of ground reported by Marlatt (5) in 1907.

Protecting Trees of Bearing Age

For many years attempts to control periodical cicadas in bearing orchards were unsuccessful because none of the available insecticides was effective against this insect. In 1948, however, Woodside of Virginia (6) and Cutright and Parks of Ohio (3) tested several of the new organic insecticides as killing agents for adult cicadas and discovered that TEPP, tetraethyl pyrophosphate, is highly toxic to them. Following the lead of these workers, several fruit growers successfully prevented excessive cicada injury to their trees by spraying with TEPP even though

this insecticide kills by immediate contact. It leaves no toxic residue on the trees after it dries.

On the basis of results obtained in Ohio and Virginia, the following suggestions are presented for controlling adult periodical cicadas in bearing fruit orchards in Pennsylvania:

Insecticide: 6 liquid ounces of 40 per cent TEPP or the equivalent amount (2.4 ounces) of actual TEPP in 100 gallons of water.

Type of spray: Mist that will envelop a tree quickly.

Time of Day: Early in the morning before the temperature rises and the cicadas become active.

Timing Applications: The first spray should be applied as soon as female cicadas begin to make egg punctures. Repeat applications will be necessary to kill new cicadas that enter the trees as they emerge from the ground or migrate into the orchard from surrounding woodland. Reinfestation may be heavy enough to warrant applying the second spray 3 to 5 days after the first. Rows of trees bordering woodland areas probably will require more sprays than other sections of an orchard.

Precaution: TEPP is an organic phosphate insecticide and anyone using it should observe the safeguards printed on the container.

Protecting Young Trees

The problem of protecting young fruit trees from injury by cicadas is difficult because a small number of females can puncture all the bark surface in a



Fig. 1. Section through egg punctures showing eggs. Magnified approximately 5 times. Photo courtesy U. S. Department of Agriculture, Bureau of Entomology and Plant Quarantine.

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comparatively short time. Recognizing the seriousness of the problem in Ohio in 1914, Gossard (4) suggested wrapping the trunks and larger limbs of young trees with paper and covering the tops with mosquito netting. This practice probably will prevent injury to young trees more completely than any other method.

Disking the orchard floor just before the cicadas emerge may prevent many of the insects from completing their development. A few Adams county growers think disking helped reduce the number of cicadas in their young orchards in 1936. Disking is a practical operation in such plantings, but it may cause damage to the roots of older trees that have been growing in heavy sod for several years.

Spraying to protect young trees from cicadas has not been successful. The trees become reinfested with damaging numbers of the insects within a short time following an application of insecticide. Nevertheless, TEPP may prevent excessive injury if it is applied two or three times a week during the period of cicada activity.

Table 1. — Timetable of expected appearances (From Pennsylvania Department of Agriculture Records (1))

YEAR	BROOD	COUNTIES
1953	X	Adams, Bedford, Berks, Blair, Bucks, Carbon, Chester, Clinton, Columbia, Cumberland, Dauphin, Delaware, Franklin, Fulton, Huntingdon, Juniata, Lackawanna, Lancaster, Lebanon, Lehigh, Luzerne, Lycoming, Mercer, Mifflin, Monroe, Montgomery, Montour, Northampton, Perry, Philadelphia, Schuylkill, Snyder, Somerset, Union, York
1956	XIII	Lancaster
1957	XIV	Adams, Bedford, Berks, Blair, Clearfield, Clinton, Cumberland, Franklin, Lehigh, Luzerne, Montour, Northumberland, Potter, Snyder, Schuylkill, Tioga, Union, York
1961	I	Adams, Cumberland, Franklin
1962	II	Berks, Bucks, Carbon, Chester, Dauphin, Delaware, Lancaster, Lebanon, Lehigh, Luzerne, Monroe, Montgomery, Northampton, Philadelphia, Pike, Potter, Schuylkill, Wyoming
1965	V	Fayette, Greene, Washington
1966	VI	Bucks, Montgomery and possibly Westmoreland
1967	VII	Allegheny, Washington
1968	VIII	Allegheny, Armstrong, Beaver, Butler, Cambria, Clarion, Crawford, Fayette, Huntingdon, Indiana, Lawrence, Mercer, Venango, Washington, Westmoreland

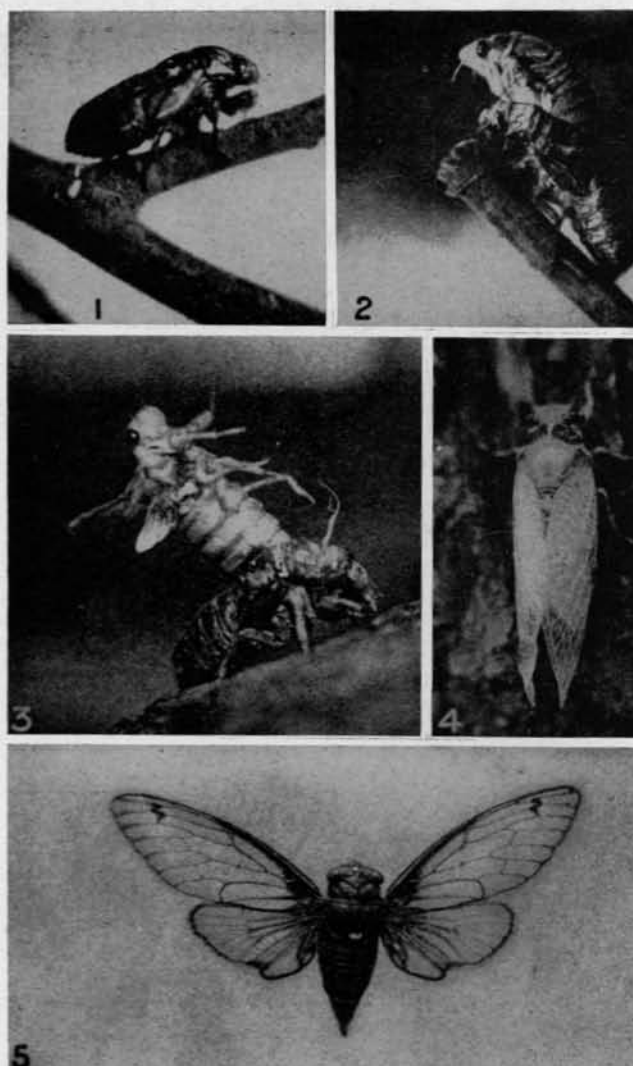


Fig. 2. Transformation of emerged periodical cicada, *Magicicada septendecim*. Photo courtesy U. S. Department of Agriculture, Bureau of Entomology and Plant Quarantine.

1. Pupa ready for transformation
2. Adult beginning to issue from pupal shell
3. Adult nearly free from pupal shell
4. Freshly transformed adult
5. Adult several hours after transformation

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