

# Connecticut Agricultural Experiment Station

New Haven

## CONTROL OF THE PLUM CURCULIO ON FRUIT TREES

Philip Garman

The plum curculio<sup>1</sup> is one of the most serious pests in Connecticut fruit orchards. It infests plums, peaches, pears, cherries and apples but damages plums and apples more than any others. The greatest commercial injury is done to apples, because of the relative size and value of that crop. Plums, and particularly peaches, frequently set enough fruit so that injury from curculios and subsequent fruit drop amounts to little more than a

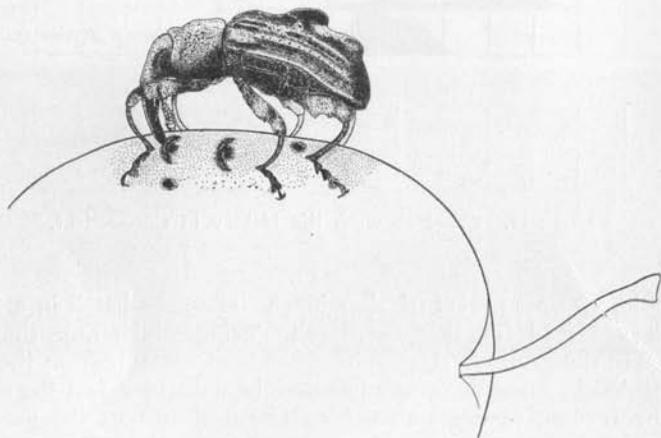


FIGURE 16. Side view of adult curculio, greatly enlarged, with feeding and egg punctures.

natural thinning. If there is a light set of either peaches or plums, then curculio control becomes important in order to save the crop. Pears and cherries are not usually injured severely.

<sup>1</sup> *Conotrachelus nenuphar* Hbst.

### Life History

Curculios pass the winter as adult beetles, hiding away in fence rows, stone walls or margins of woodlands or thickets. They begin to emerge in spring after a few warm days when the temperature reaches 60° F. If the season has been dry previously, a warm rain may bring them out in large numbers. They seek plums, apples and peaches, feeding on leaves and petals of the flowers until the fruit is set. Then they begin to feed and lay eggs on the young fruit. The majority do not reach apples, however, until after the fruit is about one-fourth inch in diameter and the greatest numbers are present 7 to 14 days after the petals have fallen. Peak egg laying

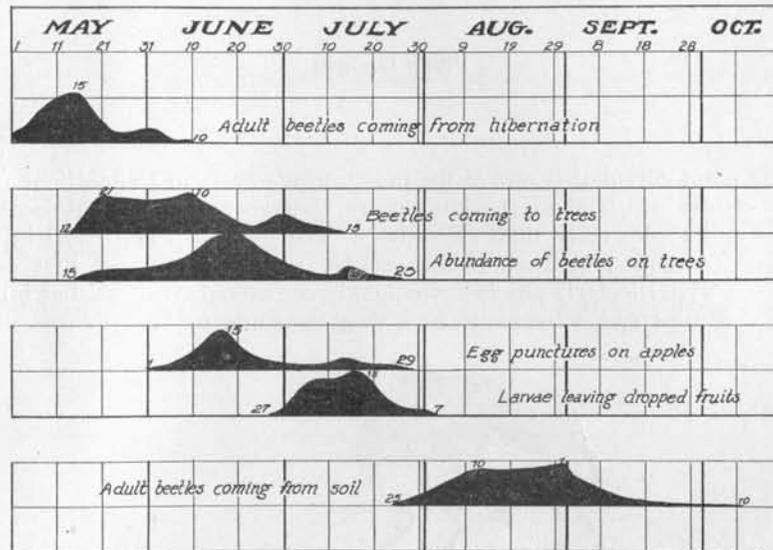


FIGURE 17. Chart showing life history in Connecticut.

occurs at the greatest period of abundance. The eggs hatch in a few days and the larvae feed for about a month, during which time the infested fruit drops to the ground. Apples or other fruit remaining on the tree are rarely infested by curculio larvae but may be deformed and the sale value lowered by feeding or egg punctures. The majority of the larvae leave the fallen fruit during July. They pupate and emerge during August. Adults emerging from the soil soon seek winter quarters in Connecticut, but do some feeding on the fruit in the fall before hibernating.

The eggs are well protected from sprays because they are embedded in the tissues of the fruit. Larvae are likewise impossible to reach by spraying. After leaving the fruit and entering the soil, cultivation under the trees destroys them as well as the pupae into which they transform. Collection and destruction of early drop fruits serves the same purpose.

The adult beetles may be poisoned by sprays and this method of control has superseded all others in Connecticut. In severe infestations, however, destruction of beetles in winter quarters, and prevention of breeding cen-

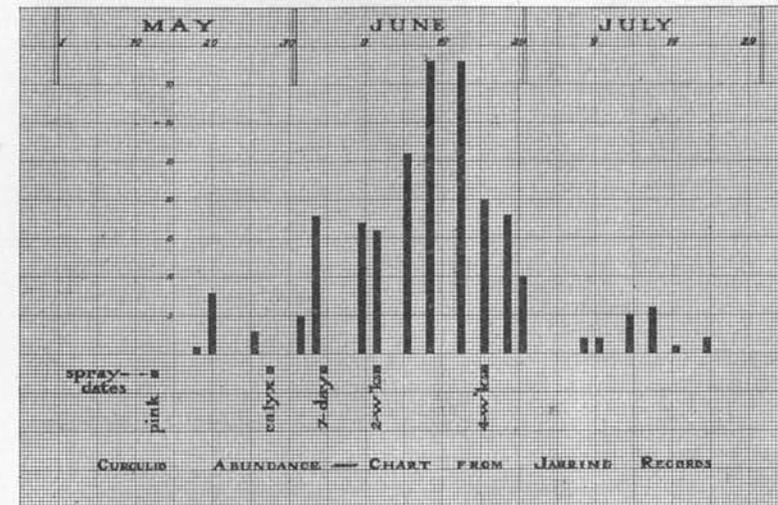


FIGURE 18. Chart from jarring records, showing periods when curculios are most abundant. Spray dates in relation to abundance are also given.

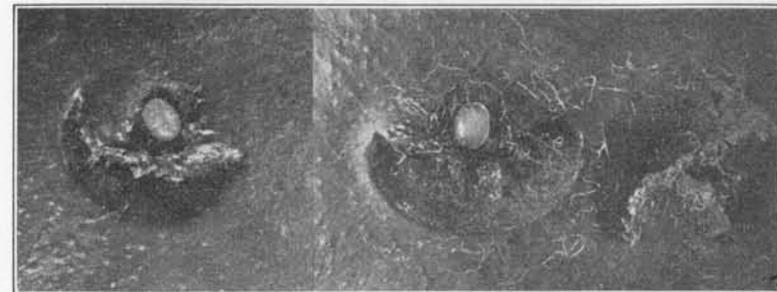


FIGURE 19. Eggs and egg punctures. The crescent-shaped scar is typical of curculio. No other apple insect makes such a scar.

ters in neglected apple or other trees surrounding the orchard should also be considered of value.

Parasitic or other enemies of the curculio are not numerous in Connecticut at the present time.

### Sprays for Control

Many materials have been used to kill the adult beetles. In general, nicotine, pyrethrum, and rotenone preparations are ineffective. The arseni-

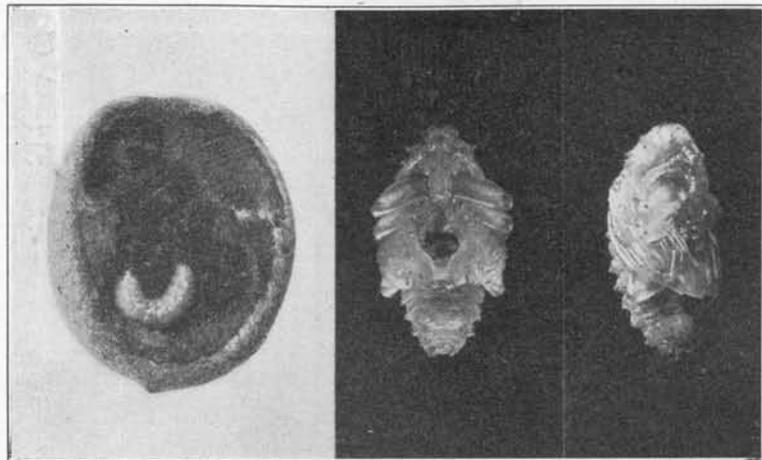


FIGURE 20. Curculio larva in peach (left) and curculio pupae (right). The pupae are very delicate and easily destroyed by cultivation.

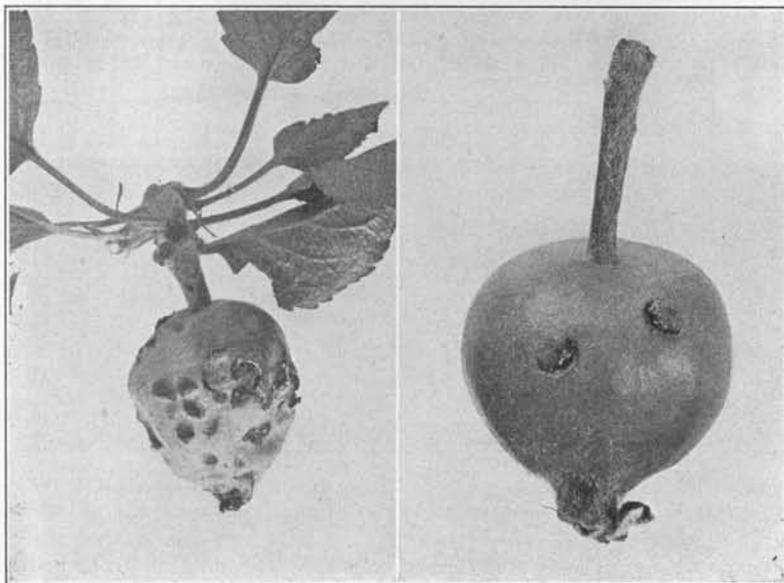


FIGURE 21. Egg scars (right) and severe injury to young fruit.

cals are mainly relied upon, and of these, standard acid lead arsenate (sold by most concerns simply as lead arsenate) is the most effective. Calcium arsenate, and the fluorine compounds such as barium fluosilicate, and syn-

thetic cryolite, have been shown to have considerable killing power for the curculio, but they cannot be generally recommended at this time to take the place of lead arsenate. More experimental work with them is needed.

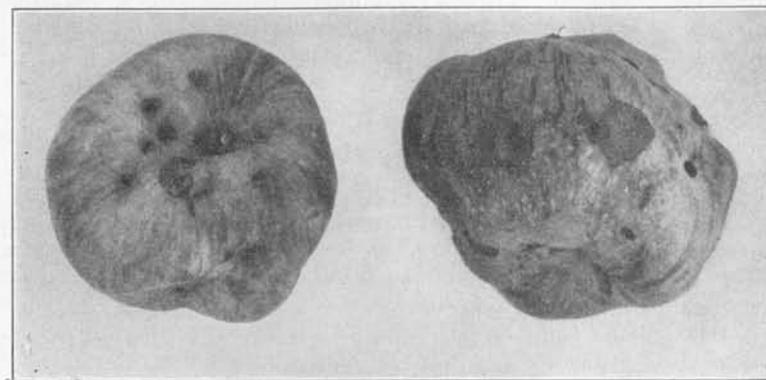


FIGURE 22. Deformed fruit at harvest time resulting from severe curculio injury.

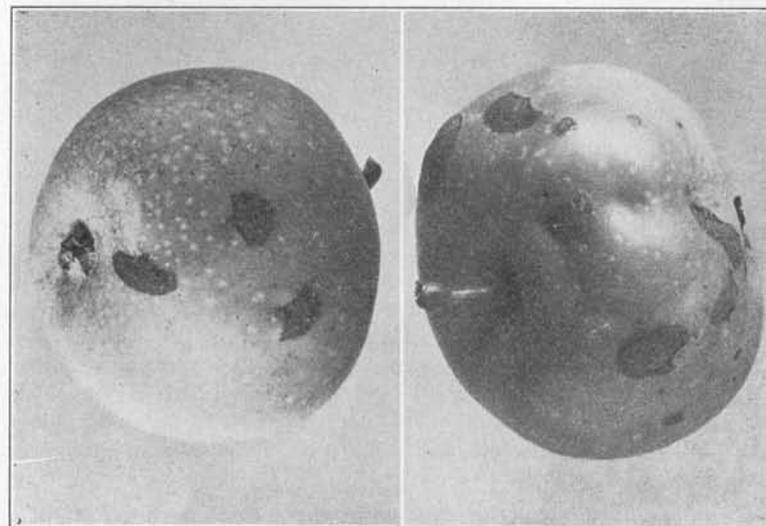


FIGURE 23. Curculio egg scars expanded from growth of the apple. The eggs were probably crushed in this fruit so that it did not become wormy and drop.

There are various ways of increasing the killing power of the poison used. Adhesive properties of lead arsenate may be augmented by the addition of fish or linseed oil, or the dosage may be increased from the usual 3 pounds to 100 gallons, to 4 or 5 pounds. The value of these measures

is disputed but it is believed that the use of stickers such as fish or linseed oil is of benefit in Connecticut, especially since the spray is held on the fruit at critical times, or during rainy periods.

For peaches, the danger of spray burn from the use of lead arsenate may offset the gain from control of curculio — particularly in commercial orchards. In order to avoid such burn, zinc sulfate may be used in the spray mixture or a large excess of lime added.

### Supplementary Measures

Wild and neglected apple trees near commercial orchards should be removed or sprayed. It is not known exactly how far the adult curculio will travel, but the greatest danger probably is from trees within one-half mile. The problem cannot be handled easily if trees lie on neighboring property. State and Federal agencies have been engaged (1934) in removal of such trees about commercial orchards. Burning out fence rows or removal of stone walls where adult curculios hibernate is of considerable benefit.

### Recommendations

**APPLES:** Spray at least three times, beginning with calyx or petal fall spray, and make applications once each week or once in 10 days. If the weather is cool, ten days between sprays will suffice, if warm (75° or above) not more than 7 days should be allowed.

Use lead arsenate, 3 pounds to 100 gallons. The special curculio spray consisting of 10 pounds of lime, 4 pounds of arsenate of lead and 1 quart of fish or linseed oil is very effective. On varieties affected by scab, such as McIntosh, the special curculio spray is recommended only in the treatment immediately following the calyx period (7 or 10 days later). On this variety lead arsenate (3 pounds to 100 gallons) with the usual fungicide is recommended for all other sprays. The special curculio spray with 3 pounds of lead arsenate instead of 4 pounds has been used experimentally for several years with good results. This may be applied to non-scabbing varieties throughout the season without additional fungicide.

Clean up fence rows about the orchard, removing brush and burning it. Remove stone walls or burn over in order to destroy climbing vines or other shelter. Attend to neglected trees near the orchard having them removed or sprayed wherever possible.

**PEACHES:** It is not generally necessary to spray peaches for curculio in Connecticut. When the trees are heavily infested or if for any reason the crop is light, and it is desired to prevent as much damage from curculios as possible, the trees may be sprayed with lead arsenate, 3 pounds to 100 gallons, with 4 pounds of zinc sulfate, 4 pounds of hydrated lime and a wettable sulfur in each 100 gallons. Apply as the shucks are pushing off the young fruit and again 10 to 14 days later.

**PLUMS:** Spray with lead arsenate, 2 pounds, hydrated lime, 4 pounds, and a wettable sulfur in each 100 gallons when the fruits are the size of

peas or when the first crescent shaped egg punctures appear. Repeat 10 to 14 days later.

**PEARS:** Spray with lead arsenate, 3 pounds, and a wettable sulfur<sup>1</sup> in each 100 gallons. Apply at calyx period and again 10 to 14 days later.

**CHERRIES:** Spray with 3 pounds of arsenate of lead plus a wettable sulfur in each 100 gallons. Apply directly after petal fall and again two weeks later.



FIGURE 24. Neglected apple tree growing under ideal conditions for curculio development. Trees such as this are a decided menace if near a commercial orchard, not only because of curculios but of other insects as well.

### Methods of Spraying

• Thorough coverage of all parts of the tree is essential in control of curculios. It is immaterial how this is accomplished, but it should be realized that much depends on the thoroughness of applications. Use enough material to cover all parts of the tree without over-spraying so that the sprays are wasted. Timeliness of application is also very important. The fruit must be well covered with spray when curculios are most abundant and active.

<sup>1</sup>Flotation sulfur, New Jersey dry-mix or any of the commercial products. Lime sulfur should not be used.