

Preventing Wormy Apples

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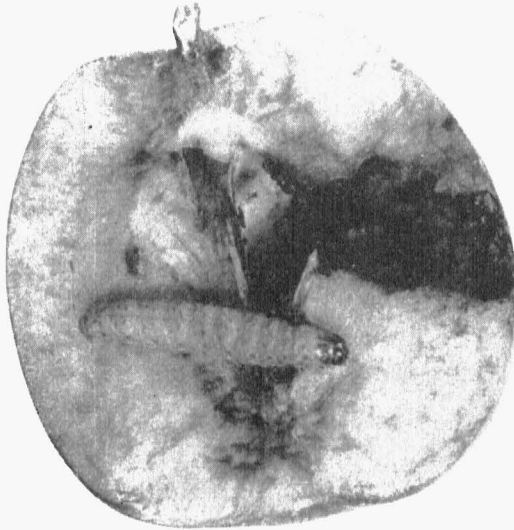


Fig. 1.—Apple worm and typical worm injury to apple.

Of the fruits, apples are Missouri's most important contribution to the nation's food supply designed to help win the war. In the production of good apples fit for shipment and storage the codling moth or apple worm is generally recognized by Missouri growers as one of the greatest limiting factors. High worm populations, in most orchards, are due largely to hot, dry seasons and regular crops which provide plenty of food for the pest, and in some cases to inadequate use of spraying and supplementary control measures.

Life History of the Pest

The codling moth passes the winter as a full-grown worm spun up in a silken cocoon, usually under loose bark and in crevices on the tree trunk. It may also winter in packing sheds and apple boxes. These worms pupate in the spring and come out as moths soon after the apple petals fall. The moths deposit their eggs mostly on the upper side of the leaves, near a cluster of young

apples. The moths are small, grayish in color, with a chocolate brown patch on the tip of each front wing. Each female moth may lay from 50 to 75 eggs, which hatch in from 7 to 14 days in the spring, depending on temperatures. The young worms crawl to the apples and enter them if they are not killed by sprays or by natural enemies.

In Missouri, there are two full broods and a partial third. The first moths usually begin to appear from May 5 to 15 and continue until about the middle of June. The moths for the second brood begin coming about June 30th to July 7th. Moths of the third brood begin to appear in early August, continuing, in some cases when there is a late fall, until mid-September.

Control Measures

Where worms are very numerous the grower cannot hope to control them with sprays alone, but must also apply supplementary controls, including scraping and banding of the tree trunks, moth-proofing the packing shed, disposal of wormy drops, and general orchard sanitation. While spraying is the most important control, it is not enough where worm populations are very high.

Spraying.—The first spray application for controlling apple worms is commonly called the calyx spray. It should be started as soon as three-fourths of the petals have fallen, and should be completed before the calyx cups have closed. Use 2 pounds lead arsenate and 4 pounds hydrated lime to 100 gallons, plus the necessary fungicide for scab control. (See Missouri Apple Spray Program for detailed information.)

The next spray is the first cover spray and it should be applied just before the first worms begin to hatch, which is usually 10-14 days after the calyx spray, using 3 pounds lead arsenate and 6 pounds hydrated lime, plus fungicide, to 100 gallons. (If you are interested in weekly reports on worm activity and spray dates, write to the Department of Entomology, College of Agriculture, Columbia, Missouri.) This and later applications should be timed by moth activity in the orchard since the dates vary considerably from year to year.

In orchards where there is a serious worm problem, two or three additional sprays, using 3 pounds lead arsenate to 100 gallons, usually are required following the first cover at about 8-day intervals for effective control of first-brood worms. Some additional control may be obtained by the addition of 3 quarts of summer spray oil emulsion to each 100 gallons of lead arsenate spray in the second and third cover sprays and in the peak spray for the second brood. However, this may complicate the problem of residue removal. Oil should never be used in combination with sulfur, and should not follow a sulfur spray sooner than 15 days.

Two or three second-brood sprays, made at intervals of 10 to 14 days, using 3 pounds lead arsenate to 100 gallons, may be needed in July and early August, depending on the abundance of worms in the orchard and, to some extent, on weather conditions. In some seasons, it may be necessary to spray again in late August, keeping the fruit well covered until picking time. The addition of 2 pounds hydrated lime to each pound of lead arsenate will help prevent arsenical burn on fruit and foliage. Where a heavy spray program of lead arsenate is applied it is necessary to clean the fruit by brushing, or preferably by washing, before marketing.

The above recommendations are for orchards having a heavy infestation and may be modified to meet the needs of young or isolated orchards.

Scraping and Banding.—In orchards where the worm population has built up to a high point, the trees should be scraped and banded. All loose bark should be scraped from the tree trunks and scaffold branches and collected and burned. A sheet should be



Fig. 2.—Tree properly scraped, with scrapings collected on canvas.

placed on the ground around the tree to collect the scrapings. In this way, many of the overwintering larvae will be destroyed and next summer the worms, finding no loose bark, will be forced to enter the bands. Scraping may be done at any convenient time from November to the first of May. Then, early next summer, place around the tree trunks, a foot from the ground, 2-inch corrugated paper bands which have been treated with oil and beta naphthol. Bands should be applied by June 5. Do not apply treated bands

to trees that have not developed rough bark. On such trees, where worms are serious, use burlap or tough paper bands and remove them and kill the worms under them every 7 to 10 days.

Mothproofing Packing Shed.—Where packing sheds have been located in or near the orchard they have greatly increased the codling moth problem in many orchards. When located nearer than one-fourth mile of the orchard, it is important to close the shed tightly before the first of May and stop all cracks where the light comes in, thus preventing moths from leaving the shed and reaching the apple trees. In case the shed cannot be tightly closed, the packing boxes, baskets, and material in which the worms can hide should be hauled to a location at least one-half mile distant from the orchard.

Sanitation.—All old boards, props, boxes, and trash that might serve as a shelter should be removed from the orchard. Removal of all drop apples at harvest time will help keep down the number of worms that will carry over winter in the orchard. Some orchardists supplement the spray program by picking the wormy apples about the second week in June and removing them from the orchard. This reduces the number of moths that will develop to lay eggs for the next brood of worms.

Suggestions for Young Orchards

On young orchards, in which worm populations have not yet built up to any extent, a somewhat lighter spray schedule may be used.

A calyx spray, using 2 pounds lead arsenate and 4 pounds hydrated lime, plus necessary fungicide, to 100 gallons, should be timed to go on when three-fourths of the petals have fallen and before the calyx cups have closed.

The first cover spray, consisting of 2 pounds lead arsenate and 4 pounds hydrated lime, plus necessary fungicide (see Missouri Apple Spray Program), should be applied about 10 days after the petals have fallen.

The second cover spray should be applied about 2 weeks later, using 2 pounds lead arsenate and 4 pounds hydrated lime.

The third cover spray should follow the second in about 2 weeks, using the same materials as in the second cover.

A fourth cover spray may be needed in July, using 2 pounds lead arsenate and 4 pounds hydrated lime to 100 gallons.

The need for later sprays will be determined by the number of worms present in the orchard during late July and August. In spraying, it is important that all the fruit be thoroughly covered with the spray material. Special attention should be given to reaching the tops of the trees.