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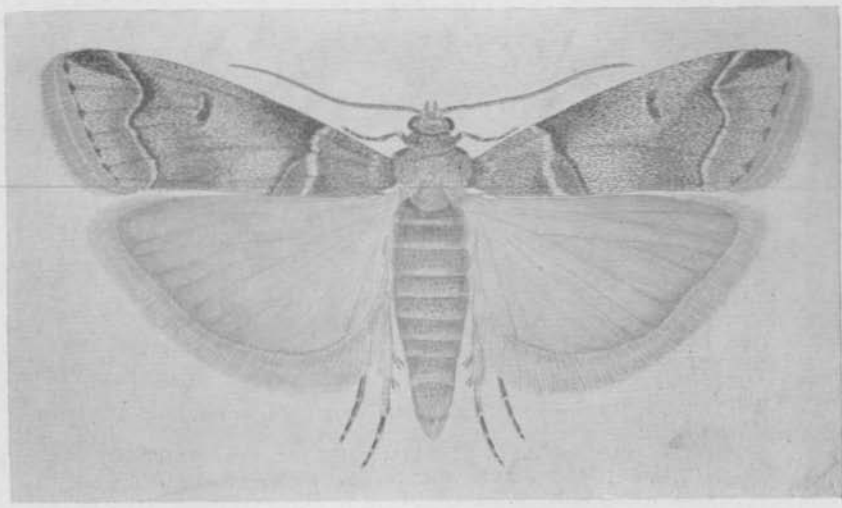
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# The Mineola Moth or Destructive Prune Worm



By  
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## Peach Twig Borer Control on Prunes

PEACH twig borers are sometimes confused with destructive prune worms. The differences between these two worms are given elsewhere in this bulletin.

Peach twig borers are very easily controlled on prunes by an application of liquid lime-sulphur testing 3.5° Baume. This material may be applied at any time in the spring before buds begin to break. Lead arsenate used at the rate of 4 pounds to 100 gallons of water sometimes gives a high degree of control if applied just as the larvae emerge in the spring, but it is difficult to time the application correctly and ineffective control often results.

### Legends for the Figures

Figure 1.—Entrance hole of destructive prune worm in fruit bud.

Figure 2.—Webs spun between buds in early spring after the larvae have left their hibernacula. One view of bud with web removed, showing injury beneath.

Figure 3.—Egg of destructive prune worm.

Figure 4.—Larva of mineola, upper, overwintering larva; lower, mature larva. Enlarged 10 and 7½ times, respectively.

Figure 5.—Pupa of destructive prune worm enlarged 7½ times.

Figure 6.—Hibernaculum of partly grown larva. Enlarged 3 times.

Figure 7.—Peach twig borer larva. Enlarged 10 times.

# The Mineola Moth or Destructive Prune Worm

By

W. E. SHULL<sup>1</sup> and CLAUDE WAKELAND<sup>2</sup>

LARVAE of the pyralid moth, *Mineola scitulella* Hulst, were discovered attacking prunes in Idaho in 1925. Prior to 1925 the species had not been recorded as of economic importance. The adult is now known locally as the mineola moth and its larva as the destructive prune worm. The insect was first described by Hulst (1900), who collected it from an unknown host in Colorado. Subsequent information shows that it was collected by Newcomer from apple near Yakima, Washington, in 1919; by Wakeland from an unknown host near Boise, Idaho, in 1921; and by Pack from wild plums and choke cherry galls in Cache County, Utah, in 1929.

When the mineola moth was discovered in Idaho, its distribution was limited to two small areas in the Boise-Payette Valleys. Its spread was rapid, and by 1930 the insect was known to be present in an area approximately 80 miles long and 4 miles wide in southwestern Idaho and southeastern Oregon. It is probably now generally present in all prune-growing areas of southwestern Idaho.

## Injury Caused by the Insect

Many buds and blossoms of prunes are destroyed in the early spring by the overwintering larvae, which bore into the unopened buds and eat the floral parts. (See Fig. 1.) They also consume large numbers of blossoms, as well as a few young leaves after the buds have opened. (See Fig. 2.)

The first generation larvae feed almost entirely in the green prunes. They destroy the inside of the fruits, causing them to shrivel and often drop. The infested prunes may be detected by their premature coloring and oftentimes by the presence of frass, which may cling to the outside of the prunes at the larval entrance holes.

Larvae of the second generation usually attack the fruit shortly before harvest. Many of the infested prunes drop before they are picked. The most important loss, however, is caused by the presence of small larvae in the harvested prunes. Large numbers of the wormy prunes



FIG. 1

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Drawings by Miss M. A. Palmer.

are detected by sorters and are thrown out, but there are many prunes in which the entrance holes of the worms are so small that they are not detected and these, therefore, go in with the packed prunes. Wormy prunes decay readily in shipping, causing breakdown of a large number of sound prunes in packed lugs or boxes before they reach the market. In rare cases the infestation is so heavy that it is not profitable to harvest the crop.



Fig. 2

### Description of the Insect

The mineola adult is a bluish-gray moth about  $\frac{3}{8}$  inch to  $\frac{1}{2}$  inch in length. It is distinctly wedge-shaped when at rest. The antennae lie straight back over the body. (See illustration on front cover.) There is a broad transverse white stripe on the fore wings, about midway. This stripe is bordered posteriorly by a smaller reddish-brown stripe. There is a similar white and red band, although much narrower and more irregular, near the posterior edge of the fore wings.



Fig. 3

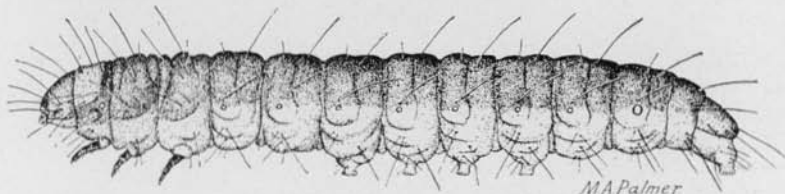
The eggs are light reddish-brown in color, oval in shape, about 0.5 millimeter in width and 3.5 millimeters in breadth. Red, and later black, coloration develops inside the egg during incubation. (See Fig. 3.)

The newly hatched larva is about 1.2 millimeters in length. The body is yellow in color and the head brown. The body is covered with many short spines. The larva turns darker as it grows, soon attaining a dark brown color. The mature larva is slightly more than  $\frac{1}{2}$  inch long, dark brown on the dorsal side and lighter, reddish-brown on the ventral with



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a distinct juncture about midway on the side of the body where the two colors join. (See Fig. 4.)



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Fig. 4

The pupa is brown in color and about  $\frac{3}{8}$  inch in length. The anterior portion is large and the posterior end tapers rapidly. (See Fig. 5.)

### Life History

The partly grown destructive prune worms spend the winter in wart-like cases or hibernacula constructed of silk and bits of bark chiefly in the crotches of buds and twigs and in bark depressions. (See Fig. 5.) The hibernacula are only 1 millimeter to 3 millimeters in diameter. They are difficult to detect because they are composed largely of fragments of bark. Larva emergence usually begins about the middle of March and is completed early in April. They become fully grown in from 2 to 4 weeks

after emerging from their overwintering hibernacula and then drop to the ground to pupate in the soil. Moth emergence starts about the middle of May and continues through June. The eggs, deposited by the female

moths deeply among the hairs on the undersides of the leaves, hatch in from 7 to 10 days. Two generations and a partial third develop annually. The first generation larvae enter the green prunes, where they feed for

about 3 weeks, and then leave the fruit and drop to the ground to pupate in the soil. The second generation moths start to emerge in July. These moths also lay their eggs on the undersides of the leaves, producing larvae which enter the ripening fruit. Most of the larvae feed for a short time and then leave the fruit to spin hibernacula. (See Fig. 6.) A few of the second generation larvae remain within the fruit to complete their growth and then drop to the ground to pupate in the soil. The moths emerging from these few pupae may lay eggs which hatch to form partially mature, third brood larvae which overwinter in their hibernacula.

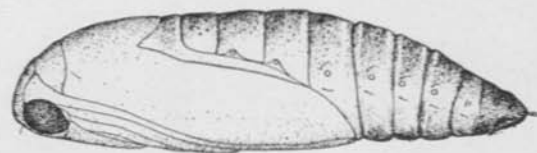


Fig. 5

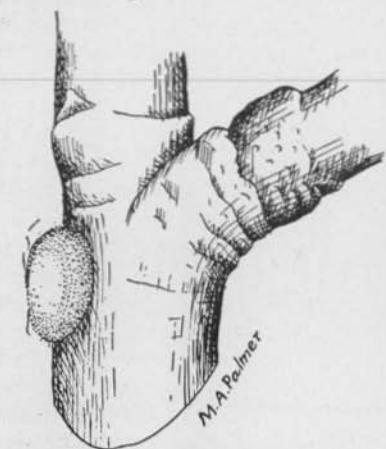


Fig. 6

### Control<sup>3</sup>

Prior to 1932, the Idaho Agricultural Experiment Station had conducted many spray tests in an effort to control destructive prune worms. Nicotine sulphate gave some promise of control early in the spring when the air temperature was above 70° F. and after larvae had emerged from

<sup>3</sup> Part of the control research was by R. W. Haegle (deceased), Assistant Entomologist, Idaho Agricultural Experiment Station.

their hibernacula. During the limited spray period available between the time the larvae had emerged from their hibernacula and the time they had entered the new buds, the usual temperature was too low for effective control with nicotine sulphate.

Other materials that have failed to give control are dormant oils applied both during the dormant period and just after spring emergence of larvae, paris green applied prior to the time larvae eat their way out of hibernacula, lime-sulphur with and without lead arsenate, pine oil, fluorine compounds, and certain commercial pyrethrum sprays. The sprays were applied against the larvae within the hibernacula, and also after the spring emergence when they were feeding within the buds. The hibernacula proved to be practically impervious to most of the materials. The larvae within the buds proved to be nearly as well protected.

Before boring into the bud the larva spins a dense web in the crotch of the bud and twig, then bores into the side of the bud near the base and covers the entrance hole with more webbing. As feeding progresses, frass is forced outside into the webbing and seems to offer increased protection against the spray materials.

The best means of direct control yet found is a dormant-type oil emulsion spray containing pyrethrins. This spray is also effective against the prune-thistle aphid, stem mothers and first generation nymphs which are present when the mineola spray is applied. The finished spray should contain  $2\frac{3}{4}$  pints of pyrethrum extract (oil extract containing 2 gm. of pyrethrins per 100 ml.) and 4 gallons of emulsified oil in 96 gallons of water. If a more concentrated pyrethrum extract is used, the amount should be reduced according to the pyrethrin content of the extract. The oil emulsion and water should be mixed as for an oil spray and then the pyrethrum extract added. This spray should be applied within from 2 to 6 days after 95 per cent of the overwintering larvae have emerged from their hibernacula, which is approximately at the time when the buds are swelling and show green at the tips and just before they begin to show white. The spray may be adequately applied at pressures ranging from 150 pounds to 350 pounds if care is exercised to obtain complete coverage. Successful control has been obtained when the materials were applied at air temperatures as low as 50° F.

The larvae show considerable activity immediately after the application of a pyrethrum spray. They attempt to leave the buds in which they are feeding. Death usually follows within 2 hours. Many of the larvae succeed in getting partly or entirely outside the bud before death, and many of them may be found dead, swinging by a thread of silk an inch or more below the bud. Most of the dead larvae within the buds will be found with their heads in the entrance holes; this position is the reverse of that of living larvae in unsprayed buds.

Spraying with pyrethrum is ineffective if conducted at any time other than as specified above. Present information also indicates that stomach poisons, when applied as cover sprays to prevent larvae from eating into prunes, are not effective in controlling larvae of any of the generations.

There is evidence that lime-sulphur may have an accumulative control effect, for where it is used annually as a dormant spray for San Jose scale, peach twig borer and spider mites, infestations of mineola are light, and specific sprays for control of mineola may not need to be resorted to. This fact has been observed and is recorded here even though experiments with lime-sulphur have shown it has little value as a direct means of control.

### Differences Between Mineola Moth Larvae and Peach Twig Borer Larvae

Prune growers sometimes mistake mineola larvae for larvae of the peach twig borer. When fully grown, mineola larvae are more than  $\frac{1}{2}$  inch long. They are brown in color and are uniformly darker from the middle of the side of the body upward than from the middle of the side downward. The legs are black and the head light brown. They spend the winter in heavy wart-like webs on the bark.

Peach twig borer larvae, when fully grown, are slightly less than  $\frac{1}{2}$  inch long and are predominately brown in color. The head and first segment of the body is black. The larvae usually appear to have light and dark brown stripes alternating crossways of the body. (See Fig. 7.) They spend the winter beneath the bark in crotches of the branches. They normally emerge in the spring later than the destructive prune worms. They first bore into the terminal twigs, causing them to wilt and die, a form of injury not caused by the destructive prune worm.

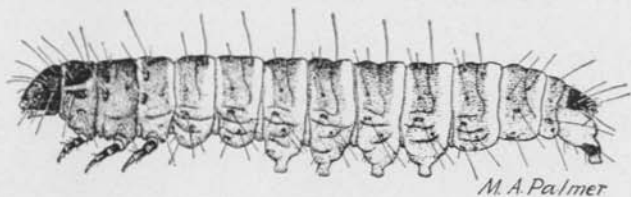


Fig. 7

