

Flare-up of Oriental Fruit Moth

costly outbreak of pest of peach orchards in 1954 resulted in co-operative research in 1955 to develop control program

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An outbreak of Oriental fruit moth—not Oriental fruit fly—caused appreciable crop damage in a small number of peach orchards near Kingsburg during the harvest of 1954. This was the first damaging flare-up of Oriental fruit moth—OFM—in the main peach belt of California.

The OFM is a small moth. The larvae—worm stages—mine tender twigs and damage fruit. It is primarily a pest of peaches—especially cling peaches—although it is known to infest other stone and pome fruits. The larvae feed in the tips of rapidly growing twigs and are confined mostly to the foliage for the first two of the five generations. Larvae of the third and fourth generations are apt to attack peaches nearing maturity.

The larval stages of the OFM closely resemble those of the true peach twig borer in appearance and habits. However, the fruit moth breeds more rapidly than the twig borer and is more difficult to control.

During the harvest of 1954, a condition of wormy peaches approached the critical stage for a score of orchardists in the Island District, south of Kingsburg. In one planting of Gaumes there was a complete loss of crop. Eleven neighboring growers experienced partial losses and difficulties in sorting.

Agricultural officials from Kings, Tulare, and Fresno counties conferred with State and University personnel and organized an advisory-research team. With assistance from grower and processing

organizations, an almost community-wide effort to combat the outbreak was initiated.

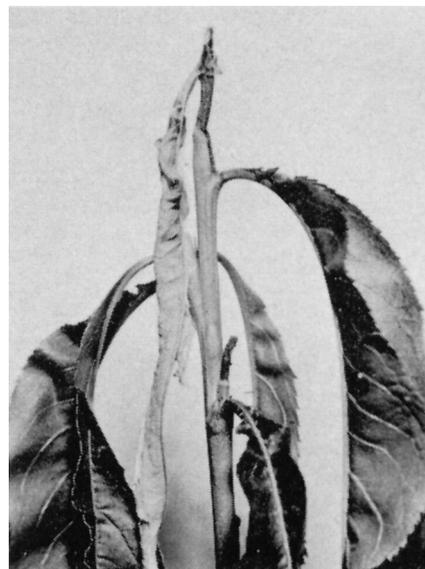
Trapping procedures inaugurated during March 1955 showed that the first flight of moths began in the early petal-fall period and rapidly increased to a maximum by the end of March. Five bait pails, operated in one of two orchards selected for research purposes, captured 1,634 moths during 35 days of the first flight period. This sampling indicated that a very high-level infestation had carried over from the previous season and that serious trouble impended unless effective abatement measures could be carried out.

Area samplings made during the second flight period located the geographic center of the flare-up within one to three miles southwest of Kingsburg. Other orchards located within or close to the Island District—in adjacent parts of Tulare and Kings counties—have fairly active twig-feeding OFM infestations that are not quite heavy enough to cause significant fruit loss. Exploratory trapping by the State Bureau of Entomology revealed another localized flare-up near Exeter.

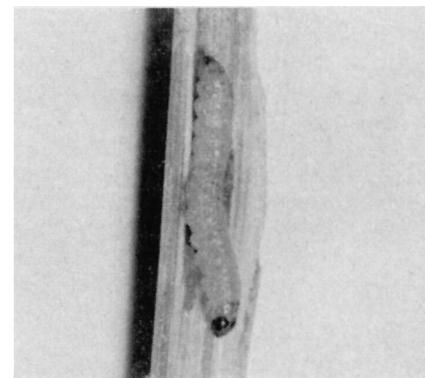
Control

The tentative spray program planned for 1955 included only three applications of DDT, one spray for each of the first three broods of larvae. The first spray—

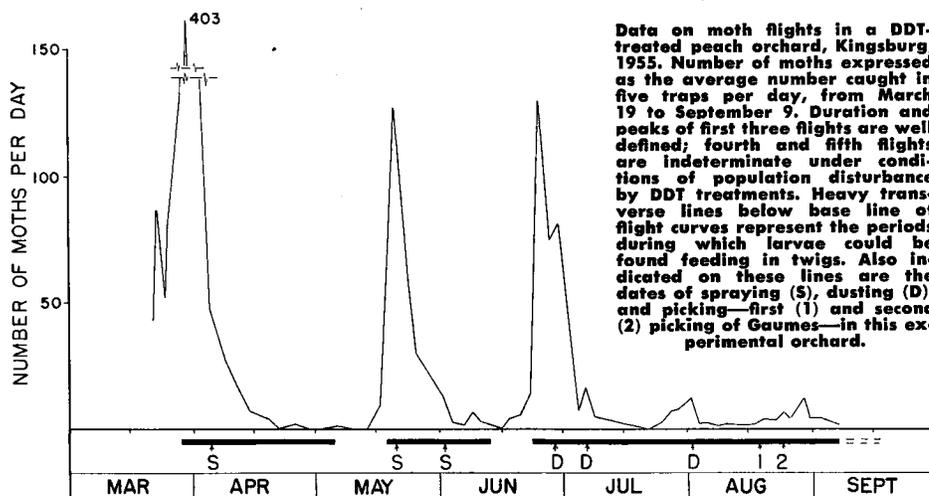
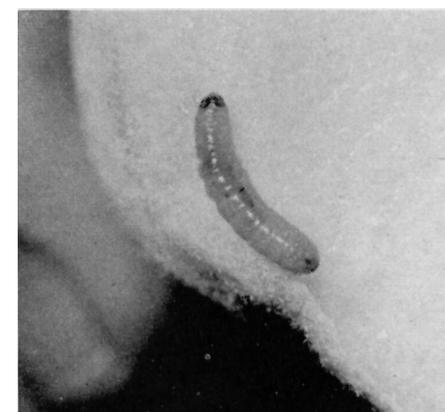
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Peach shoot with two tips mined by an OFM larva.



Above: Infested twig opened to show larva in its tunnel. Below: Mature larva crawling on peach.



MOTH

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applied in the petal-fall period—did not adequately reduce the infestation. When trap counts began to soar in the second flight period, the tentative program was revised to include additional applications of DDT. A series of sprays or dusts were applied during the course of the second flight as follows: two standard sprays—50% DDT, two pounds per 100 gallons—10 to 12 days apart; or three dusts of 10% DDT—50 pounds per acre—at intervals of seven days; or any comparable DDT spray and dust combination dictated by irrigation schedules. Orchards where moderate residual infestations persisted later received two additional dusts during the third flight and, in exceptional cases, a final dusting was put on late-season clings at the outset of the fourth flight of the moth.

The experimentally treated orchards with high initial infestations passed the harvest period with only traces of wormy fruit, few twig-feeding OFM larvae, no

Adult or moth stage perched on peach leaf.



FILBERTWORM

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has been developed which shows any real promise in controlling the filbertworm. Lead arsenate sprays, applied in August and September when the filbertworm larvae are entering through the cracks in the walnut husks, have given the best results. Such sprays applied during the 1955 season reduced the degree of infestation by about one half; this, however, is not enough reduction to give commercial control.

Infestations in walnuts vary greatly from year to year, and ecological investigations are needed to determine the reasons for this. Natural enemies may possibly play an important role, and in some years parasites may reduce the moth population to such an extent that few migrate to walnut orchards.

Observed Effects of Repeated Treatments with DDT Applied to Peaches for Control of Oriental Fruit Moth

Variety	Sequence of DDT Treatments	Days Between Last Dust and Harvest	Harvest Data*			
			Date of Harvest	Per Cent Wormy Peaches	DDT Residues—PPM	
					Fresh	Canned
Fortuna	SSDDD	41	July 21	0.0	2.9	..
Elberta	SSSDD	28	Aug. 3	1.0	4.4	..
Gaume	SSSDDD	17	Aug. 18	0.4	3.3	<0.1
Halford	SDDDDD	33	Sept. 9	0.3	3.0	0.7

S = Spray, D = Dust. *Chemical analyses by Toxicology Laboratory, Department of Entomology, Berkeley. Pilot plant canning by Department of Food Technology, Davis.

peach twig borers, and with acceptable DDT residues on samples of harvested fruit. Spot checks and reports from various sources indicated that peaches harvested from treated orchards throughout the areas of infestation at Kingsburg and Exeter were satisfactorily free of worms.

In the light of recent experience, it seems likely that a second year follow-up with a less drastic series of treatments will leave only trace populations to be controlled thereafter.

The 5th and 6th DDT treatments described above were applied experimentally against heavy infestations under constant surveillance. This program is not suggested as practical for general use. A more compact schedule, with adjusted timing and few applications, will be developed for trial next season.

Cause of Flare-up Unknown

Traces of the OFM appear to have persisted in some areas of the state's main peach belt for ten years or longer, and just why these quiescent infestations have flared up in some orchards but not others is not understood. The OFM was first found in California in 1942, in Orange County. Soon thereafter—1943-46—an official survey conducted by the State

Department of Agriculture demonstrated its presence in fourteen counties. Significant infestations were found in southern California. Extremely light or trace infestations were pinpointed in the San Joaquin Valley, and rare, single specimens were trapped in a very few orchards in the Sacramento and Santa Clara Valleys.

Many of the locations in the Central Valleys having formerly demonstrated traces of OFM do not now show impending trouble with reviving infestations.

Since it is not now possible to define the conditions under which the OFM can flare up, all peach growers—especially those whose orchards are located in Kings, Tulare, and southern Fresno counties—should be alert for signs of trouble with this pest. Unusual amounts of worm-infested fruits should be examined carefully for fruit moth larvae.

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To determine the seasonal population trend of filbertworm moths, bait pans were established in a walnut orchard near Gridley. The seasonal catch for 1954 and 1955 is shown in the graph on page 11. The filbertworm population was extremely large in 1954 and the infestation in the harvested crop—as much as 30% to 40% in some orchards—was the most severe since the beginning of the walnut insect investigations in 1944. Despite early harvest, 26% of the nuts in the orchard where traps were operated were infested. In 1955, the moth flight was much less than in 1954 and the degree of infestation in the harvested crop was greatly reduced. In the experimental orchard, the procedure of early harvest was again followed and the infestation amounted to only 3%.

The value of bait pans is clearly indicated, since the trend of infestation is

established early in the season and so the possible degree of infestation in the harvested crop can be predicted well in advance of harvest.

Early harvest in itself, however, is not sufficient to reduce the infestation below an economic level in outbreak years—as in 1954. If an effective spray control program is devised, bait pan records can be utilized each year to forecast the population trend of the filbertworm and thus to indicate the necessity of control treatment.

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