BLACK LIGHT TRAPS

—help determine flights of codling moths and other deciduous fruit pests

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Black light traps have been shown to be an efficient means of trapping many lepidopterous pests which attack deciduous fruits. They can also be used in determining the flight habits of moths that are not attracted to baits, such as the peach twig borer and navel orangeworm. The black light traps offer a more accurate means of timing sprays for codling moths because they will attract insects that are comparatively young in terms of reproduction. In addition they would probably be more effective in attracting moths when populations are low.

Bait pans have been commonly used in California to determine the proper timing of codling moth sprays in pears and apples, but were not effective in attracting other economically important moths.

Black lights were used successfully in 1961 to attract navel orangeworm in the field, and also provided data on codling moth, peach twig borer, filbertworm, and fruit tree leaf roller. It had not been possible previously to observe navel orangeworm adults in the field except under conditions of extremely high numbers, and no means of trapping adults had been found.

The traps consisted of galvanized tin funnels 23 inches long with an upper diameter of 20 inches to accommodate a light fixture mounted horizontally across the rim. The funnel tapered to 2 inches in diameter at the bottom, and the metal screw band of a quart jar lid was soldered to the trap. The source of light was a 15-watt black light tube. The traps were hung from limbs in the orchard close to a source of power. Moths were captured in a quart jar partially filled with 70 per cent alcohol. Jars ordinarily were changed three times a week, but more frequently during hot weather.

Black light trap hanging from walnut tree in a northern California orchard. Black light tube is mounted horizontally across top rim. Galvanized tin funnel tapers down into a quart jar for insect collection.

Moths in the alcohol were filtered, dried and identified in the laboratory. They retained their characteristic color patterns because there was little opportunity for them to fly about in the jar and become defaced.

Codling moth

The light traps in walnuts were located in Walnut Creek (Contra Costa Co.), Yuba City (Sutter Co.), Live Oak (Butte Co.), and San Jose (Santa Clara Co.). Three of these orchards provided data on codling moth, and the flight patterns obtained at San Jose and Walnut Creek are illustrated in one of the graphs. The two areas showed a similar flight for the first and second broods, although the peaks varied in intensity.

In pears at Marysville, the black light was compared with a white light of the same intensity and a bait pan. The black light captured far more moths than the white light, and considerably more than the bait pan. The significance, however, was that the black light trapped moths before they were found in the bait pan, and the peak first brood flight was recorded a week earlier. The females were preserved and dissected, and the data showed that moths from the light trap contained eggs and were reproductively young. Moths from the bait pan could be considered as spent females, as the abdomen contained little fat body and no eggs.

Navel orangeworm

Data on the flight of navel orangeworm was obtained from the traps at Yuba City and Walnut Creek. The data (see graph) shows a flight in early spring which represents moths of the overwintering generation from old nuts on the ground and in the tree. There is a continuous flight of

low intensity through June and July and a steady build-up after mid-July which reaches a peak in October. The trap at Yuba City was discontinued before the late summer peak was reached, but an upward trend is shown through August. A comparison of the codling moth and navel orangeworm flights recorded from the light trap at Walnut Creek shows that the spring peak of navel orangeworm occurred before the first brood flight of codling moth. The peak of navel orangeworm activity in late summer was reached after the second brood flight of codling moth.

Peach twig borer

A black light trap was operated in an almond orchard at Brentwood primarily to obtain information on navel orangeworm. Adults of the peach twig borer were also attracted to the light and it was possible to obtain information on the seasonal flights of both twig borer and navel orangeworm in almond (see graph). The first twig borer adults were caught on May 3 which correlated with the appearance of first brood larvae in mid-May. Four peaks of twig borer activity were recorded for the season, one in mid-May, and the others in mid-July, early September, and late September. The latter flights indicate an overlapping of the summer broods. The data on navel orangeworm shows a flight pattern similar to that obtained in walnuts. There is an early spring flight followed by a period of continuous, but low, moth activity. In late summer, a steady build-up occurs with a peak in mid-September. This late season peak occurred a month earlier in almonds than in walnuts.

Other moths

Filbertworm and fruit tree leaf roller were encountered in the light traps. The filbertworm adults were not numerous, but the numbers captured correlated with the infestation found at harvest in walnuts. The fruit tree leaf roller was extremely abundant in the spring months, and the moths were present at each light trap location. Very few orange tortrix adults were captured, as this species does not seem to be attracted to black light. A trap was operated for a time in an apple orchard with a known history of orange tortrix, but so few adults were taken that the trap was discontinued.

One drawback

There is one drawback to the use of these traps, and that is the attraction the black light has for a wide range of insects. On warm evenings it is not unusual to fill a quart jar with leafhoppers, water boatmen, beetles, and a large number of moths, especially Noctuidae. This makes separation and identification of the desired specimens a tedious undertaking. It may be possible to overcome this difficulty with traps designed to screen out unwanted insects or to run the light only at those periods when the economic species are most active.

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