

Pome Fruits—Biology

Apple, Dispersal of Pandemis Leafroller Larvae

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PLR moths were confined to one branch in nylon cloth cages (August 15) on each of three apple trees (Red Delicious) in the center of a 9-acre apple orchard (Fig. 1). The orchard was in its fourth leaf, planted on an 18 x 12 ft (5.4 x 3.6 m) at 201 trees per acre. This orchard had been treated with encapsulated methyl parathion (Penncap-M) at a rate of 6 pints per acre on June 14. Post-treatment samples showed that the average PLR density was 0.19 larvae per tree. Trees on which moths were caged were 56 to 60 m apart (9 to 10 rows). After sufficient time was allowed for mating and oviposition the cages were removed along with any remaining live moths. Leaves on the limb were examined and the number of egg masses recorded. Egg masses were examined daily until hatch at which time they were removed and the number of eggs per mass determined by counts made in the laboratory under magnification. On November 3, 50 leaves containing mines of the western tentiform leafminer (WTLM) were collected from the tree containing egg masses (release tree) and from the 34 trees immediately surrounding the release tree (Fig. 1, small square). Mines on these leaves were examined in the laboratory under magnification and the number of PLR larvae recorded. This sample was taken because PLR larvae had been observed to inhabit unoccupied WTLM mines in samples taken for this insect earlier in the year. From Nov 3 to 10, foliage on the release tree and each of 54 trees surrounding it (Fig. 1) was examined and the number of PLR larvae recorded.

The number of PLR larvae per tree and the distance from the release tree are shown in Fig. 2. Most larvae, 68.7%, of the total larvae recovered were found on the release trees. There was no relationship between distance from the release tree and number of larvae per tree. The solid line shown was fit to data from trees at different distances from the release tree. The slope is not different from zero, indicating that there was no relationship between distance from the source and number of larvae per tree. Ten percent of the larvae recovered were on trees closest to the release tree, within the same row or the next row to the release tree (shaded squares in Fig. 1), and 8.8% of the larvae recovered were found by moving away from the release tree one additional tree (cross-hatched squares in Fig. 1). There was no strong directional orientation to the distribution of larvae. Wind in this orchard generally came from the west. However, 11.2, 11.8, 9.2, and 8.4% of the larvae were found to the west, east, north and south of the release tree, respectively. A similar pattern of larval distribution was observed in other orchards where trees containing naturally deposited egg masses were sampled for PLR larvae. It appears that larvae are capable of dispersal as first instars but that chance of successfully establishing on a tree was not related to distance, at least under the orchard conditions so far studied.

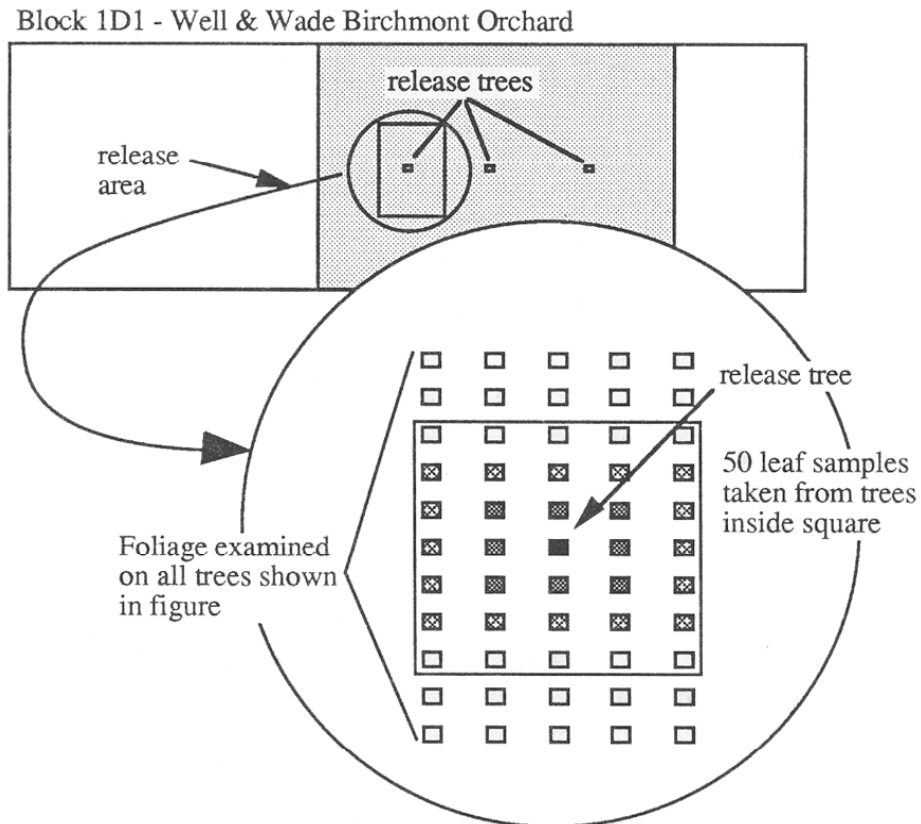


Figure 1. Experimental design for leafroller larval dispersal study.

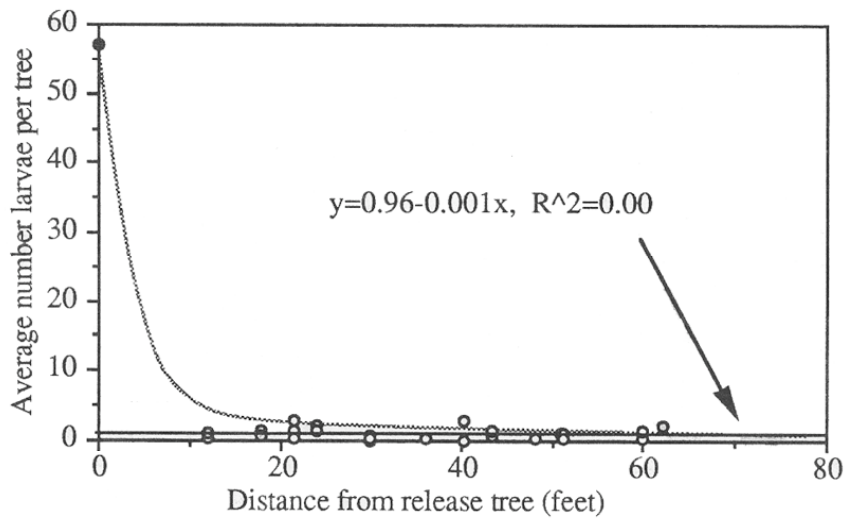


Figure 2. Relationship between leafroller larval density and distance from the tree on which egg masses occurred.