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Tentiform Leafminer

A New Idaho Pest

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The tentiform leafminer is a new pest in Idaho's tree fruit areas. It was first discovered in an Emmett apple orchard in 1981 and has since spread into Payette and Ada counties. Leafminers were found in Utah in 1977 and in the major apple producing areas of Washington and Oregon in 1981. This pest is native to central Europe and was introduced into eastern North America in the 1930s and has gradually moved west since that time.

Apple trees are the preferred hosts, although pears and other fruit trees may be infested. Damage results when the larvae burrow into the leaf and feed between the leaf surfaces causing a "mine." Continued larval feeding causes dead areas on the leaf surface, thus reducing the photosynthetic capability of the leaves. The feeding disrupts the processes of growth regulation and ripening that are affected by hormones produced in the leaves. Severe leafminer injury may cause leaf drop, reduced fruit size, premature ripening and fruit drop. Reduced fruit set may occur the following season.

Life Cycle

The adult tentiform leafminer is a slender, brown moth about 3/16 inch (4 to 5 mm) long with silver markings on the wings. In the spring about 2 weeks before bloom, the adult moths emerge from overwintering pupae found in fallen leaves on the ground. First brood larvae are present from bloom through June. Second and third generation moths occur during mid-June and early August, respectively. Corresponding larval broods are present from late July to August (second brood) and August through October (third brood). The moths remain active until freezing weather sets in. There are three generations per season. The first generation in the spring is somewhat distinct, however, the second and third generations overlap so much that they appear continuous.

Leafminer eggs are laid on the undersides of leaves and hatch in 5 to 16 days depending on the season and temperature. Each female deposits an average of 25 eggs in her lifetime.

Larvae develop through five stages or instars. The first three instars are called "sap feeding stages" because they feed on the sap from the inner leaf tissues. In the process of feeding, they separate the leaf undersurface from the tissue above. The fourth and fifth instars feed on the leaf tissues and are referred to as "tissue feeding" stage. This feeding gives the mines a tent-like appearance with visible areas where green tissue has been removed. Larval development takes about 24 days for the first and second generations and considerably longer for the third. When fully grown, the larvae are about 1/6 inch (4 mm) long, cylindrical and pale green in color. Just before pupation, the larvae turn yellow.

Pupae are 1/8 to 1/6 inch long (3 to 4 mm) and change in color from yellow to dark brown when mature. The pupal period lasts about 10 days for the first two generations. The third generation extends through the winter. Before emerging as an adult, the pupa cuts through and protrudes from the lower leaf surface. The pupal skin remains attached to the leaf after the adult has emerged.

Economic Levels

Little information is available on this pest in the Northwest. In the eastern U.S., however, economic loss has been noted if there are more than four mines per leaf by July or if 20 percent of the leaf surface is destroyed by that date.

To prevent serious damage in infested blocks, check 20 cluster leaves per tree on five trees per block for **first generation** sap feeding miners. If the average number of mines is one or more per leaf, treat the

block. If the average is less than one mine per leaf, but there are hot spots in the block that exceed the threshold, treat the block.

For **second brood** sap feeding larvae, examine 20 leaves per tree on five trees per block. If the average number of new mines is two or more per leaf, treat the block. The third brood has not yet proven to be a problem when first or second brood are adequately controlled. Pesticides are not effective against the tissue feeding (4th and 5th instar) stage. Sprays should be timed to kill the sap feeding larvae (1st, 2nd or 3rd instar) or adults. This spray should be applied about June 12 in southwestern Idaho.

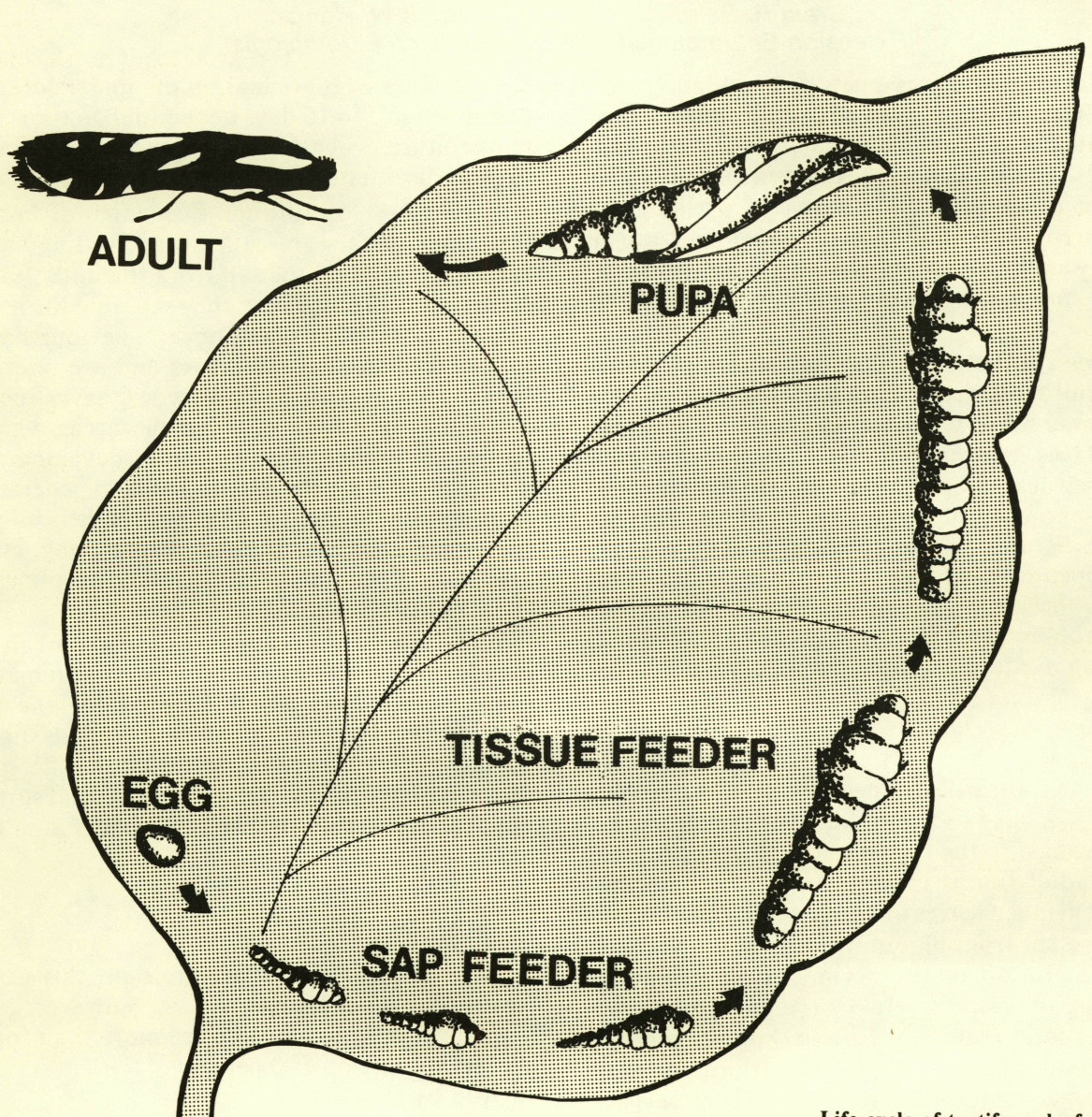
Control

In other states where the tentiform leafminer has become a pest, they have data for 2 or 3 years of high moth numbers in infested orchards. This was followed by several years of minimal numbers in which the moth population was heavily parasitized by tiny wasps. Mortality also resulted from a polyhedral virus infection.

Certain cultural practices aid in controlling the leafminers. Since the pupae overwinter in the leaves that have fallen, disking or light cultivation will bury the leaves and reduce the winter survival of the spring generation.

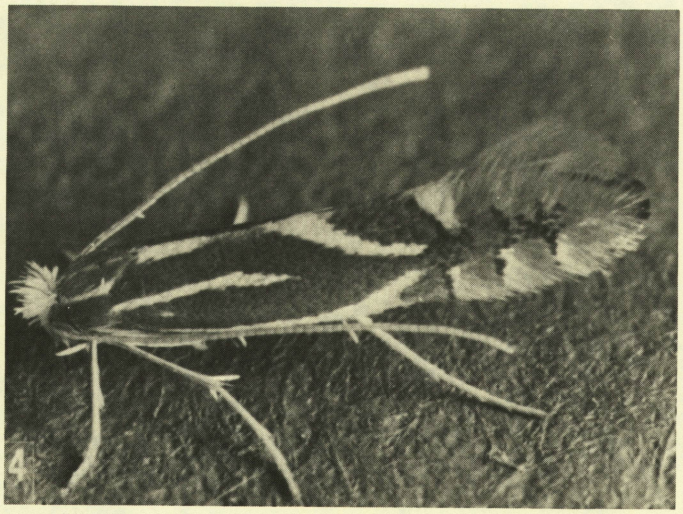
Pheromone traps give information on the beginning, peak and end of moth flight, but they cannot be used to determine the need for control of larvae. Check leaves for larvae and mines shortly before petal fall and again as the second brood larvae hatch in late June or July.

Abandoned or unmanaged apple trees are a major source of the leafminer. Since the trees are not sprayed



Life cycle of tentiform leafminer.

Leaf damage from tentiform leafminer.



Adult tentiform leafminer.

regularly, moth populations develop to high levels and serve as reservoirs for surrounding orchards. Backyard apple or crabapple trees also harbor the moth when left unsprayed. For this and other reasons of pest control, unmanaged trees should be removed.

Pesticides applied for codling moth are usually not effective in controlling the leafminer because the timing is wrong. The leafminer generations occur between the codling moth sprays and thereby escape. Also, most sprays do not penetrate readily the leaf to kill developing larvae.

For trees located around homes, use the same spray schedule as listed for commercial orchards, but spray with Sevin (carbaryl) because it is less toxic to people and pets. This spray must control the adults before they lay their eggs because it will not control the larvae inside the leaf.

When leafminers reach levels requiring pesticide use, this spray schedule should be followed in commercial orchards:

First Spray (pink stage): Vydate L — 2 pt/100 gal (Preferred); Lannate SP — .5 lb/100 gal or 2 lb/acre; Nudrin SP — .5 lb/100 gal or 2 lb/acre; Lannate L — 2 pt/100 gal or 1 gal/acre; Nudrin L — 2 pt/100 gal or 1 gal/acre; Pydrin — 2 2/3 fl oz/100 gal or 5 1/3 to 16 oz/acre.

Remarks: The pink stage spray is the most important spray to control the leafminers. This reduces later generations to tolerable levels.

Second Spray postbloom or June 10 to 15: Vydate, Lannate and Nudrin will kill adult moths **plus** the 1st, 2nd or 3rd instar larvae already in the leaf.

Caution: Lannate and Nudrin are especially detrimental to predator mite populations and disrupt integrated mite control efforts. They should not be used for post bloom sprays unless the leafminer damage so indicates.

In some instances, adult moths may become very numerous in late season (mid-September or later). At this stage, they can do little damage to the crop, and pesticide sprays are not recommended.

Trade Names — Trade names are used in this publication to simplify the information presented. Such use does not imply endorsement of any product nor criticism of similar products that are not mentioned.

Chemical Recommendations — The chemical recommendations are based on the best information available at the time of printing. Before using any pesticide, read the instructions on the label. Follow all precautions and restrictions for safe product use.

The grower is responsible for residues on his crops. He also is responsible for drift from his property to adjacent properties or crops.

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