

## THE PEAR THRIPS

(By Dudley Moulton of the Department of Agriculture, engaged in Deciduous Fruit Insect Investigations.)

(Continued from Friday.)

Thrips have displayed very decided preferences for certain flower parts. It has been mentioned that they choose the inner side of the almond calyx cup. In pears they are partial to the tiny blossom stems and to the tips of petals and, when blossoms have opened, to the stigma and style. This last injury is especially noticeable on cherries, where the writer has many times found the stigmas and styles blackened as a result of the feeding of thrips, while the rest of the blossoms were untouched.

Injury on leaf buds and on tender foliage is almost as marked as when blossoms alone are attacked, although there can be no closely drawn line of distinction, because of the close interrelation of leaf and blossom buds. Trees that have been ravaged for three or four days cannot again put forth new leaf buds and assume a natural growth for several months, and then they appear sickly for the entire year. Often they cannot start anew until the thrips have actually left the trees, as the insects continue to hinder each new effort which the trees may make.

The pear thrips is known to feed on the following plants, and it is probable that this list, extensive as it is, is not complete: Almond, apple, apricot (several varieties), cherry, fig, grape, peach (Muir and Nicol's clings preferred), pear (especially Doynne du Comice and Bartlett), plum, prune, walnut (English).

The insect shows a decided preference for certain varieties of pears, pears and peaches, but of the other fruits all varieties seemed to be attacked alike. The pear thrips have been collected from the following indigenous plants: blossoms from the Madrona (*Arbutus menziesii*) and wild California lilac (*Ceanothus thyrsiflorus*), and foliage of poison oak (*Rhus diversiloba*). All these plants however, were near thrips infested orchards, and, moreover, only a few individuals were taken from each of the plants.

### Feeding Habits of the Larvae

Thrips larvae feed almost entirely on young, tender foliage and on the surface of fruits. They conceal themselves in the terminal buds and often, as on the cherry, they attack the under side of the leaves, usually near

the prominent veins. They cause the leaves to become much contorted, ragged, and full of holes. The insects seem at times to take advantage of certain tendencies in the growth of plants on which they happen to feed. For example, newly opening pear or apple leaves show a tendency to roll from the sides inward and thrips find this inner protected surface a most desirable feeding place. In such a case the upper, inner surface is destroyed, and the leaf, instead of opening out, becomes rolled up tight and eventually dies. The insect thus secures the tenderest of leaf tissue for its food, and also protection in the folded leaf. Thrips often cause a deadening of the leaf margin, and in such cases the leaf is forced into an abnormal, often cup-shaped growth. This is a very characteristic injury on pear trees. The feeding injury of thrips larvae on fruits, especially pears, is in a way superficial, but it seriously impairs the appearance of the ripened fruits and greatly lessens the value of the finished product. The prune grows to be larger than a grain of wheat before the dead calyx is sloughed off. Larvae feed under the protection of this dead calyx, and as a result an abrasion of the skin, the feeding injury, is noticeable, even on very small fruits. The wound appears first as a small brown spot which enlarges and produces a scab as the fruit matures. The seriousness of what might first seem a small surface marking is more readily appreciated when one recalls that when pears are being cured the tough scabby spot does not shrivel up during the process of drying as does the flesh of the prune, nor does it assume a darker color as does the prune.

Thrips larvae are often carried by various means from the original food plant to other hosts, being blown, for example, from a tree to grass or weed beneath. They have no wings and cannot fly back to the tree. A few crawl up again, but most larvae adapt themselves to the new plant until fully grown, when they, too, go into the ground. Many of the common weeds have thus been found supporting larvae, although no full grown thrips have ever been seen feeding or depositing eggs on such plants. The insect has proved itself to be a strictly fruit tree pest, and it is carried to

weeds and lives on them or on other plants only by accident.

### LIFE, HISTORY AND HABITS The Egg, The Ovipositor and Oviposition.

The thrips egg is bean shaped, light-colored, almost transparent, and is very large in proportion to the size of the abdomen when seen within the body of adult female. It is about .022 mm. long by actual measurement.

The ovipositor is made of four distinct plates. Each plate is pointed, has a serrate outer edge, and is operated by powerful muscles and plates within the abdomen. The pairs on each side fit together along the inner edges with a tongue-and-groove-like structure, which in action renders possible a sliding back and forth, or sawing motion. The ovipositor is protected within a sheath in the ventral tip of the abdomen when not used, but before and during oviposition it is lowered until almost at right angles to the body.

Oviposition accompanies feeding. It seems necessary, indeed, that before the ovipositor can be inserted through the plant epidermis the thrips must first weaken or break an opening through the tissue with the mouth parts. The successive operations of lacerating the plant tissue, lowering the ovipositor, placing an egg, and withdrawing the ovipositor require from four to ten minutes, and may be briefly described as follows: After making an incision with the mouth parts the insect moves forward, drops and inserts the ovipositor, and by operating tiny saws she makes a deep ovipositor etalon shrivel emfwp eta incision in the plant tissue. While the ovipositor is still deeply set in the plant, an egg is conducted through the cavity between the plates and deposited underneath the epidermis. The ovipositor is withdrawn and the egg is thus left deeply embedded within the plant. During the oviposition period one often find a branch or a tree, or even many trees, on which almost all thrips are ovipositing at the same time.

(To be continued.)

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