

# PEAR PSYLLA\* IN WASHINGTON

Extension Service

State College of Washington

By L. G. Smith, Extension Entomologist

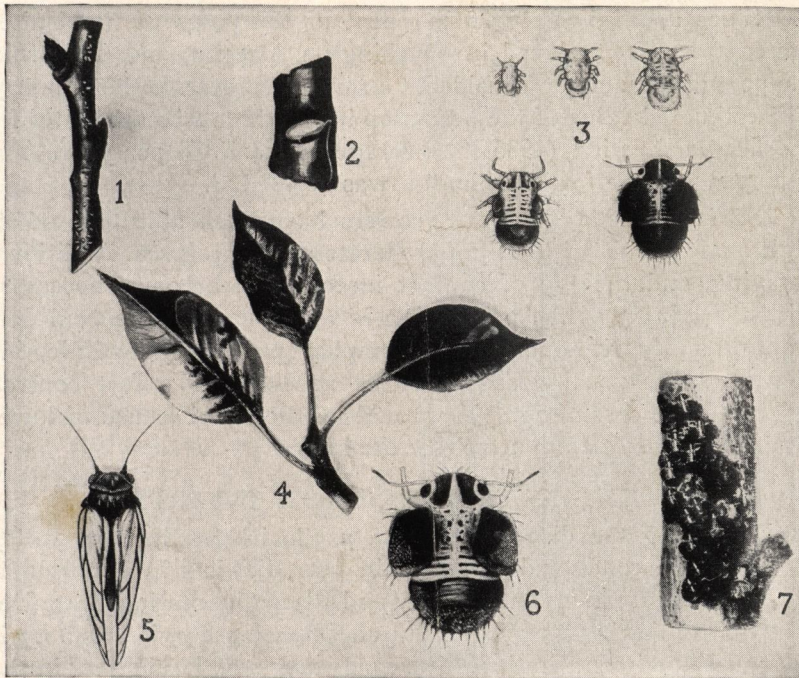


Fig. A. Life Stages and Injury of the Pear Psylla. 1, eggs on the twig, slightly enlarged; 2, egg, greatly enlarged; 3, the five nymphal stages, enlarged; 4, leaves injured by psylla and showing the sooty fungus; 5, adult, enlarged; 6, fifth nymphal stage or "hardshell," greatly enlarged; and 7, hardshells and younger nymphs on twig, enlarged. Illustration furnished through courtesy New York Agricultural Experiment Station.)

One of the most injurious insects that attacks pears, the pear psylla (*Psylla pyricola* Foerster), was discovered in the State of Washington for the first time in the Spokane valley in July, 1939. The insect

\* Pronounced Silla.

Acknowledgment is made of the helpful information furnished by representatives of the Bureau of Entomology and Plant Quarantine, U. S. Department of Agriculture.



was first found in Connecticut in 1832, presumably having been introduced into the United States from Europe. Since that time the psylla has spread over the eastern states into Ontario, Canada, on the north; North Carolina on the south, and as far as Illinois to the west. The infestation in Washington and Idaho is the only known infestation west of the Mississippi river. Psylla is reported to be the main limiting factor in producing pears in eastern states. In some orchards it has been so destructive and difficult to control that commercial pear production has become unprofitable.

#### A MENACE TO THE PEAR INDUSTRY OF THE PACIFIC COAST

Since approximately 70 per cent of the pears of the United States are now produced in Washington, Oregon, and California, the pear psylla may be considered a serious menace to the industry. The estimated value of the pear crop in the three western states for the five-year period (1935-39) averages \$11,363,374 per year. The five-year average for Washington was \$3,421,132.

So far Washington pear growers have been able to produce high quality fruit with only a moderate spray program. Additional spraying, and the use of contact insecticides, becomes necessary with the advent of the pear psylla in an orchard. A delayed dormant oil spray with one or more nymphal sprays of oil and nicotine sulfate at the usual dosage may be necessary to effect control. Added to the cost of spraying would be the loss because of lower grades that result from attack by the insect.

#### EXTENT OF THE AREA NOW INFESTED

Following the discovery of the psylla in the Spokane valley surveys were conducted in the main pear districts by representatives of the Bureau of Entomology and Plant Quarantine, State Department of Agriculture, Agricultural Extension Service, and Agricultural Experiment Station. The examination of 25,351 trees in the 1939 surveys failed to disclose any infestation outside the Spokane valley.

Early in 1940, intensive surveys by Bureau scouts disclosed infestations in Stevens, Pend Oreille, Lincoln, Whitman, Adams, Grant, Douglas, and Franklin counties. However, these infestations were found mainly on backyard and farmyard trees not surveyed the previous year. No commercial area was affected.

Late in the summer of 1940 an intensification of the surveys revealed light infestations at various points in Okanogan county and in the Mission creek and Peshastin creek districts of Chelan

county. A somewhat heavier infestation was found in the Entiat district of Chelan county. The density of infestations in the Entiat and Spokane districts now indicates establishment of several years' duration.

#### DESCRIPTION AND LIFE HISTORY

The adult psyllids are about 1/10 of an inch long, dark reddish brown in color, and have transparent wings that slope roof-like over the abdomen. (Fig. A-5). These adults pass the winter beneath the bark of pear and other trees, and beneath leaves and debris in and about the orchard. They emerge from hibernation in the early spring (March 2 in Spokane in 1940). Soon after emergence, the females deposit small white eggs (Fig. A-1 and 2) in crevices around the buds and on the smaller branches and fruit spurs of pear trees during the early stages of the swelling of the buds (Fig. B). In Spokane county in 1940, the first eggs were found on March 16 and egg deposition continued until shortly after bloom. Later in the season the eggs are usually deposited along the midrib on the undersides of the leaves. The eggs hatch in nine days to four weeks, depending on the temperature. The majority of the eggs of the first brood hatch just before the buds begin to separate (Fig. C). In Spokane county in 1940 the first nymphs were observed on April 12. Each female lays approximately 500 eggs according to observations in New York state.



Fig. B. Spur showing eggs (1) deposited by overwintering females during early stages of bud swelling. (Illustration furnished through courtesy Bureau of Entomology and Plant Quarantine, U. S. Department of Agriculture.)



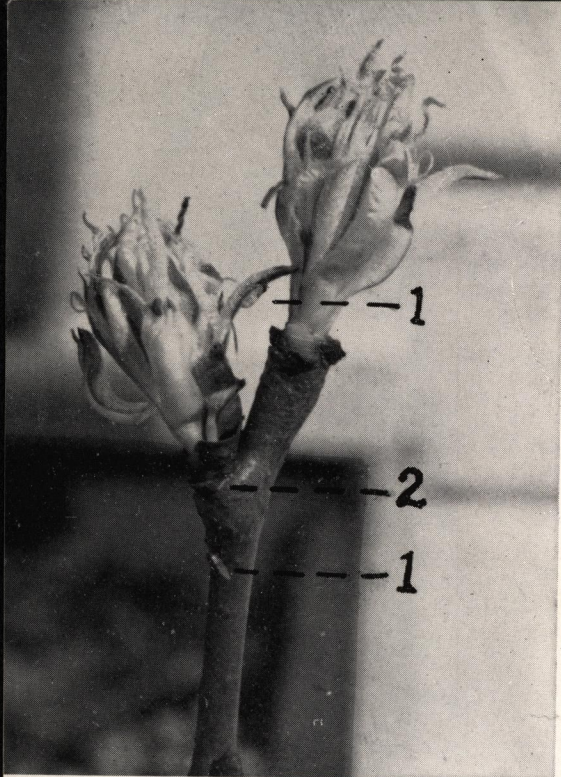


Fig. C. Branch showing buds in stage of development when majority of eggs of first brood hatch. 1, adult psylla. 2, eggs. (Illustration furnished through courtesy Bureau of Entomology and Plant Quarantine, U. S. Department of Agriculture.)

The newly hatched nymphs migrate to the buds and settle on the leaf petioles and the fruit stems, where they feed by sucking out the plant juices.

The nymphs pass through five stages (or moults) (Fig. A-3), requiring approximately five days for each stage, before maturing to adults. During the early stages the nymphs are yellow in color and covered with a drop of clear, sticky secretion called "honeydew." During the summer these nymphs are usually found on the undersides of the leaves. In the later stages they are brownish black in color and are called "hardshells" (Fig. A-6). Frequently these "hardshells" are found in the axils of the leaves. The first summer adults appeared about the middle of May in the Spokane area in 1940, with successive generations appearing

at approximately one-month intervals. Observations indicate there may be at least four and possibly more broods each season in Washington. Therefore, a heavy infestation can build up from a few over-wintering adults.

### INJURY

A severe infestation of nymphs, feeding on the leaves, causes the leaves to drop prematurely. The loss of leaves lowers the vitality of the trees, which, in turn, reduces the crop in subsequent years. Because of their weakened condition, the trees are more subject to winter injury.

The "honeydew" secreted by the nymphs runs down over the leaves and fruit. In this "honeydew" grows a black, sooty fungus which causes dead areas to appear in the leaves (Fig. A-4) and scalding and deformity of the fruit (Fig. D). The fruit is consequently reduced in grade.

### HOST PLANTS

Pear and quince are the only known host plants of this insect. All varieties of pears are attacked, the Bartlett and d'Anjou being especially susceptible.

Adults have been observed on apple foliage, but the insect does not develop to maturity on this tree.



Fig. D. Pears showing injuries caused by psylla infestation. The darkened area on the pear at the right shows the effect of scalding by "honeydew." (Illustration furnished through courtesy Bureau of Entomology and Plant Quarantine, U. S. Department of Agriculture.)

### ERADICATION PROGRAM

The cooperative surveys during the summer of 1939 indicated that the psylla occurred throughout the Spokane valley of Washington and Idaho, but no infestation was found in the main pear producing areas. With the insect thus confined to a restricted area, area, State and Federal agencies concerned with this problem took immediate steps to formulate an eradication program.

Funds were made available through an allotment from Federal appropriations for control of emergency outbreaks of insect pests, and plant diseases. State appropriations now have been made to supplement federal funds to be used in coping with the problem. The program is under the direction of the Bureau of Entomology and Plant Quarantine with the State Department of Agriculture, the Agricultural Extension Service, and the Agricultural Experiment Station cooperating.

Eradication activities started in March, 1940. The four main methods of attack used were:

#### 1. Scouting

Continual scouting is necessary to locate all pear trees, to de-



termine the limits of the area infested, to discover any new points of infestation, and to reflect the progress of the eradication program. During this survey work in 1940, 53,055 trees were examined in Washington outside of the Spokane area.

## 2. Spraying

A spraying program was inaugurated in March, 1940, to reduce the infestation, thereby reducing the possibilities of spreading the insect. The application of a properly timed delayed dormant oil is now recognized as the most effective treatment for control of pear psylla.

The majority of the commercial growers in the Spokane area cooperated by applying this spray to their total of 8,300 trees, and the Bureau of Entomology sprayed 11,739 trees, making a total of 20,039 trees receiving the delayed dormant oil spray. As soon as blossoms fell and fruit was set, nicotine and oil sprays were applied to control the nymphs. Five of these sprays were applied in the area of heaviest infestation. New infestations received treatment as soon as they were discovered. The continuation of this spraying program is absolutely essential to achieve eradication.

## 3. Tree Removal

The removal of unprofitable, uncared for trees in backyards and abandoned orchards is an essential part of the program. This reduces the number of trees that must be inspected and sprayed whenever found infested. This part of the program in the area surrounding the Spokane valley was designed to create a pear-free zone to serve as a barrier around the infested area. The removal of these trees also released many growers from required fumigation of produce under quarantine regulations. The prompt removal of infested trees in Adams, Douglas, Franklin, and Grant counties has to date eliminated the necessity of placing these counties under quarantine. The tree removal work is still in progress, and some 10,000 trees have been taken out.

## 4. Quarantine Regulations

A quarantine was promulgated by the State of Washington to regulate shipments of commodities from the infested areas in such a manner as to prevent the spread of the insect artificially to other areas (Fig. E). This prompt action by the State of Washington has served to prevent other states from placing quarantine restrictions on Washington products. The quar-

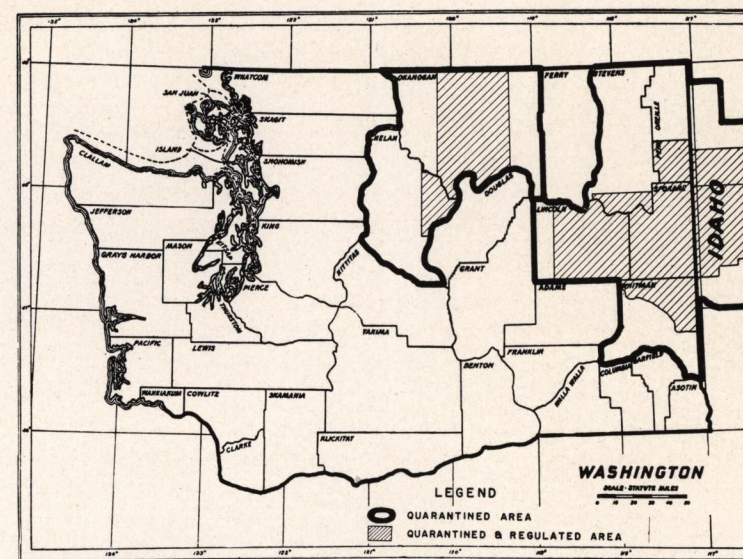


Fig. E. Map showing area in the State of Washington now under quarantine regulations because of pear psylla infestation. (Map furnished through courtesy Bureau of Entomology and Plant Quarantine, U. S. Department of Agriculture).

antine regulates the movement of all agricultural produce, packing equipment, railway cars, trucks, containers, lumber, wood, nursery stock and compost from and within the infested area. Such produce originating in or near a definitely known infestation is required to undergo fumigation before being permitted to move from the regulated area. As stated above, the removal of infested trees releases many growers from the required fumigation.

## SUGGESTIONS FOR COOPERATION OF GROWERS

1. Remove, or indicate to the horticultural inspector or county Extension agent desire to have removed, all pear or quince trees not receiving a regular spray program. This includes backyard trees in city lots and home orchards and abandoned orchards. Removal of these trees will eliminate the necessity of regular inspections and spray treatments; it may also prevent or eliminate quarantine regulations on other produce.

2. Spray all commercial pear orchards in districts near known infestations with a delayed dormant application of mineral oil emulsion at a concentration of 3.2 per cent actual oil (ordinarily 4 gallons of commercial emulsion to 100 gallons of water). Such a prac-



tice may destroy incipient and undiscovered infestations of pear psylla, and at the same time serve as the regular dormant spray for scale and European red mite.

3. Watch for the small adults resting on the leaves, or secretions of "honeydew" on the leaf petioles, leaves, fruit stems or fruit which may indicate the presence of the insect. Report suspicious evidences of an infestation to the county Extension agent or horticultural inspector immediately.

4. Aid in every possible manner in the effort being made to suppress this serious pest and prevent it from becoming established in the main pear-producing areas of the Northwest.

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