



## Pear Psylla (*Cacopsylla pyricola*)

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### Do You Know?

- Pear psylla is an important pest of pear in Utah
- Young and adult psylla feed in leaf phloem tissues, producing sticky honeydew
- Psylla can cause fruit russetting and stunt trees; psylla shock and transmission of pear decline can kill trees
- Insecticides are currently the major control tactic, although predators and parasites provide some biological control
- A dormant insecticide treatment about 6 weeks before bloom will prevent overwintering adults from laying early eggs
- Monitoring adult densities is important to detect increases in psylla populations throughout the growing season



Fig. 1. Adult summer form pear psylla<sup>1</sup>



Fig. 2. Pear psylla nymph<sup>1</sup>

Pear psylla (*Cacopsylla pyricola*), a western Europe native, is a very small sap-feeding insect and is considered the most serious insect pest of pear in the United States. Serious infestations can stunt, defoliate, and even kill trees. Psylla feeding produces copious amounts of sticky honeydew that can cause fruit russetting. All commercial pear varieties are attacked, although smooth skinned pears are more injured than russeted varieties, and Asian and red pears are less prone to injury than European and green pears.

Pear psylla is found throughout northern and central Utah and can have 3–4 generations per year. Primary control occurs during the dormant period when psylla adults begin laying eggs. This timing occurs about six weeks before bloom and when daytime temperatures exceed 45° F. A good monitoring program will indicate if and when summer controls are necessary.

### HOSTS

pear, quince

### LIFE HISTORY

#### Summer Adult – Damaging and Monitoring Stage

- **Size and color:** 2.5 mm long and tan to light brown with clear wings; smaller than overwintering adult (Fig. 1)
- Sucks sap from foliage and succulent tissues
- Develops from egg to adult in about 1 month during the early season
- There are 2–3 summer generations before winter generation develops in the fall

## Egg

- **Size, shape, and color:** minute, oval, and creamy white to yellow
- **When and where:** before buds open in spring, and through early fall, eggs are deposited in lines or rows on the terminals and fruit spurs (Fig. 3); after buds open, eggs are deposited along mid-veins and petioles of developing leaves and on stems and sepals of blossoms
- Hatch when foliage appears and continues throughout growing season



Fig. 3. Pear psylla eggs at base of bud<sup>2</sup>

## Nymph – Damaging Stage

- **Size and color:** early instars are about 1.6 mm long and light yellow; later instars are dark green to dark brown with wing pads and two conspicuous red eyes (Fig. 2)
- **Shape:** cylindrical, but appear flattened
- **Where:** found on the undersides of leaves
- Pass through five instars, which are generally covered by a drop of honeydew
- Moves little at first but later instars move easily
- Feeds and develops on new growth and water sprouts
- Produces honeydew

## Winter form Adult – Overwintering Stage

- **Size and color:** 4 mm long and red-brown to black; larger and darker than summer adults
- **Shape:** resembles miniature cicada with wings held roof-like over the abdomen
- **Where:** hides under bark, under litter on the orchard floor, or in sites outside the orchard
- Adults leave the pear trees in Oct.-Nov. for wintering sites and return about 6 weeks before bloom
- Feed by sucking juice from the host tree
- Begin laying eggs after buds begin to swell

## HOST INJURY

### Honeydew and Russet

Nymphs and adults suck sap primarily from the tender foliage of the new shoots and water sprouts. Feeding by nymphs produces a large amount of honeydew, which makes the tree sticky and promotes the growth of sooty mold (black fungus). The honeydew can run onto fruit causing dark russet blotches or streaks resulting in unmarketable fruit.

### Pear Decline

Pear psylla transmits a phytoplasma that causes "pear decline" (Fig. 4) This disease has killed thousands of trees in the western U.S. and Canada. It prevents nutrients from moving down the tree and results in root starvation. Symptoms include stunted shoots, small or curled leaves, reduced fruit size, twig dieback, and premature leaf drop. Highly susceptible root stocks can die quickly. Pear rootstocks are available that are tolerant of the disease even with severe psylla feeding.

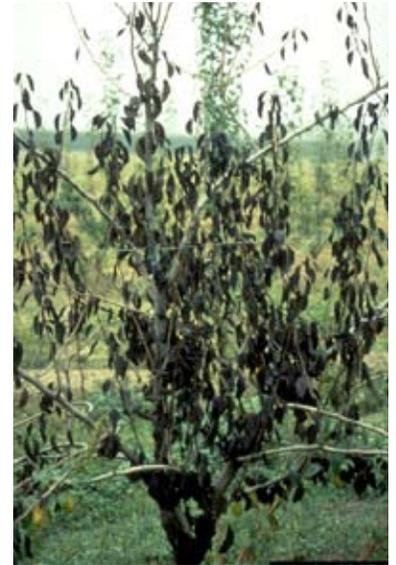


Fig. 4. Pear decline caused by phytoplasma transmitted by pear psylla<sup>3</sup>

### Psylla Shock

Psylla inject toxic saliva as they feed, and under heavy feeding, psylla shock can occur. Symptoms include stunted growth, wilting, defoliation, and fruit drop. Trees experiencing psylla shock are vulnerable to winter injury and may have reduced fruit set the following year.

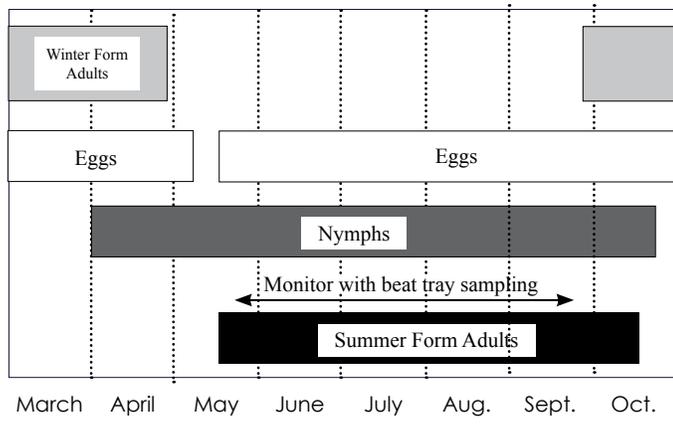
## MANAGEMENT

### Monitoring

Check for active psylla on tree spurs and branches beginning about 6-8 weeks before bloom and when daytime temperatures exceed 45° F. This is when winter form adults begin mating and laying eggs (Fig. 5). Post-bloom monitoring should continue throughout the growing season in order to detect increases in populations before they reach damaging levels.

- Look for adults by jarring them from limbs onto a white cloth tray (referred to as the "beating tray" method). Use a piece of stiff rubber hose or padded

**Figure 5.** Life history of pear psylla for northern Utah. There are three to four generations per year.



stick to beat the branches. The tray can be square or round and measure 18 inches x 18 inches (square), or 20 inches in diameter (round).

- A standard sample consists of 10 beating tray counts in blocks of an acre or less and 20 counts in blocks larger than an acre. Blocks should be sampled about once every two weeks.
- Emphasize sampling in parts of the orchard with a history of high populations.
- Keep a record of adult population counts for each orchard throughout the season (see [Pear Psylla Sampling Form](#)).

## Insecticides

Chemical control is difficult because the pear psylla rapidly develops resistance to insecticides. It has already developed localized resistance to pyrethroids all across its range. As such, it is very important to alternate between pesticide classes to prevent or slow resistance.

For best results, apply the first spray at dormancy, targeting the pre-egg-laying winter form adults (based on whether they are found during monitoring). Dormant oil alone, or mixed with an insecticide, reduces the pear psylla population and delays egg-laying by three to five weeks. This delay helps to synchronize egg hatch, which makes subsequent sprays more effective. Additional pre-bloom treatments may be required based on monitoring, with a threshold of 0.2 adults per beating sample.

Monitoring may indicate that summer sprays are needed to keep populations below damaging levels throughout the growing season. Insecticides are more effective if applied when most of the nymphs are in the first three instars rather than later instars because 4th instar nymphs and adults develop a hard shell.

Post-harvest insecticide treatments have generally been ineffective due to the insect's ability to migrate great distances into the orchard in spring.

## Dormant

- dormant oil (Superior, Supreme, Lilly Miller\*, Concern\*) alone or with:
  - endosulfan (Phaser, Thiodan)
  - esfenvalerate (Asana, Onslaught, Ortho Bug-B-Gone\*)
  - kaolin clay\*
  - lambda-cyhalothrin (Warrior)
  - lime sulfur
  - permethrin (Ambush, Pounce, Bayer Advanced Complete Dust\*, Hi-Yield Permethrin Concentrate\*)

**Pre-bloom** (start at delayed dormant and repeat only if necessary, based on monitoring)

- horticultural oil plus:
  - endosulfan (Phaser, Thiodan)—do not use more than twice per season
  - esfenvalerate (Asana, Onslaught, Ortho Bug-B-Gone\*)—do not use more than twice per season
  - lambda-cyhalothrin (Warrior)—do not use more than twice per season
  - lime sulfur
  - permethrin (Ambush, Pounce, Bayer Advanced Complete Dust\*, Hi-Yield Permethrin Concentrate\*)—do not use more than twice per season
- kaolin clay\*
- pyriproxyfen (Esteem)

**Post-bloom** (only if monitoring exceeds threshold)

- *Beauvaria bassiana* (Botaniguard)
- carbaryl (Sevin\*)
- clothianidin (Arena, Clutch)
- endosulfan (Phaser, Thiodan)—do not use more than two times per season
- imidacloprid (Provado, Admire, Alias)
- insecticidal soap, with or without neem oil\*
- pyriproxyfen (Esteem)
- thiacloprid (Calypso)

\*Insecticide products that may also be available for use on home fruit trees.

NOTE: All brand names are registered trademarks. Examples of brands may not be all-inclusive, but are meant to provide examples of effective insecticides registered on peach in Utah. The availability of insecticides is changing rapidly. Always check the label for registered uses, application and safety information, and protection and pre-harvest intervals.

## Cultural and Mechanical Controls

As populations of psylla increase rapidly on highly vigorous trees, avoid practices that overstimulate tree growth.

- Apply the minimum amount of nitrogen fertilizer necessary to achieve adequate fruit set and good fruit size.
- Avoid summer pruning which encourages shoot growth.
- Pull off water sprouts or suckers growing from scaffold limbs through the center of the trees in order to remove tender foliage that psylla feed on and also to allow sprays to penetrate better. Pull water sprouts by hand rather than cutting them with loppers to minimize regrowth. (This should be done before sprouts develop woody attachments to limbs, usually before the end of June.)

## Biological Control

A number of predators and at least two parasitoid species attack pear psylla in Washington. The common predators include:

- anthocorid bugs
- predaceous plant bugs
- lacewing adults and larvae
- ladybird beetle adults and larvae
- spiders

Two parasitoid wasps—*Trechnites psyllae* and *Prionomitus mitratus*—lay eggs inside the bodies of psylla nymphs where the wasp larvae consume the psylla host as they develop.

Effectiveness of biological control increases in orchards where fewer codling moth treatments are applied such as in mating disruption blocks.

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<sup>1</sup>Images courtesy of ARLO PELEGRIN, Washington State University Tree Fruit Research Center

<sup>2</sup>Image courtesy of Shawn Steffan, USU Extension

<sup>3</sup>Image courtesy of L. Giunchedi, Università di Bologna ([www.bugwood.org](http://www.bugwood.org))

**Precautionary Statement:** All pesticides have benefits and risks, however following the label will maximize the benefits and reduce risks. Pay attention to the directions for use and follow precautionary statements. Pesticide labels are considered legal documents containing instructions and limitations. Inconsistent use of the product or disregarding the label is a violation of both federal and state laws. The pesticide applicator is legally responsible for proper use.

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