

X-disease Phytoplasma and Little Cherry Virus Scouting and Sampling Guide



WSU Tree Fruit
Extension



Oregon State University
Extension Service



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Andrea Bixby Brosi*

X-disease Phytoplasma and Little Cherry Virus

Scouting and Sampling Guide

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Introduction

Little cherry virus 1 (LChV1), Little cherry virus 2 (LChV2) and X-disease phytoplasma cause small cherry symptoms often described as ‘Little Cherry’ or ‘X-disease.’ Diseased trees produce cherries of small size and poor color and flavor making the fruit unmarketable. X disease is at epidemic levels in the Columbia River basin, with high incidence in Yakima, Benton, and Franklin counties, and present in Oregon, The Dalles area. Timely scouting and aggressive tree removal are essential to reduce the spread of the disease. Infected trees spread the pathogen to neighboring trees by insect vectors or via root-grafting from tree-to-tree. Infected trees can not be cured and MUST be removed entirely. This guide is designed to provide information on symptoms, scouting and sampling to encourage effective tree removal and management.

Major Symptoms

Small and misshapen fruit.

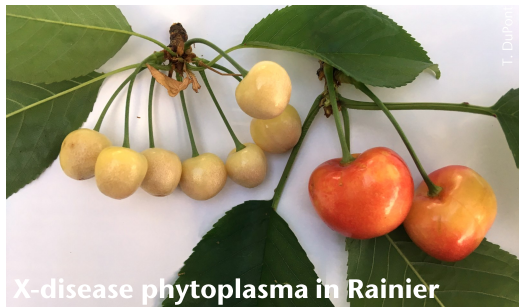
Poor color development.

Fruit lacking in flavor.

Symptoms can be confused with unripe fruit until close to harvest.

Symptoms are restricted to one/a few branches unless trees have been infected for multiple years.





Progression of Symptoms

Early infection (Year 1), small fruit may be restricted to one branch, or cluster, fruit color may develop normally, or individual pale fruit may be observed.

Middle infection (Years 2-3), small fruit observed on multiple or all limbs, and poor color development is pronounced.

Terminal infection (4+ years), generally reduced fruit yield, and with X-disease phytoplasma infection dieback of limbs.





Symptoms Vary

Symptoms can vary from small fruit to discolored and misshapen fruit.

Symptoms can be confused with unripe fruit until close to harvest.





In peaches, plums, and nectarines

X-disease symptoms are typically yellowed curled leaves and shot hole as well as small deformed fruit.

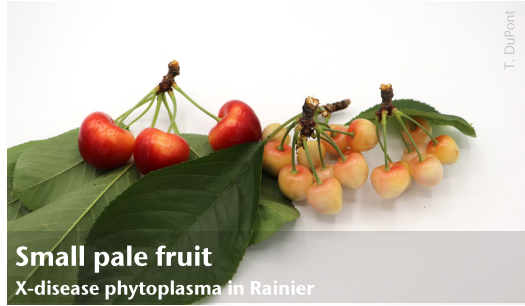
Leaf yellowing symptoms on infected peaches and nectarines begin to appear about 2 months prior to harvest, and get progressively worse, with shotholes appearing as the season progresses.

Symptoms Checklist

- ◇ Cherries smaller than normal?
- ◇ Cherries round or misshapen/pointed?
- ◇ Color too pale?
- ◇ Skin mottling or blotching (buckskin)?
- ◇ Cut into the cherry
 - ◇ Is the pulp color correct?
 - ◇ Is the seed small or misshapen?
- ◇ Taste the cherry
 - ◇ Is it bitter?
 - ◇ Tasteless?

If you have two or more of these symptoms, please check for LCV and X-disease phytoplasma.





Other disorders with similar symptoms

Water/salinity stress, and over-cropping symptoms generally throughout tree vs one branch.





X-disease phytoplasma or Little cherry virus has NOT been confirmed in block.



1. Scout teams walk blocks and mark suspect trees.



2a. Samples sent to lab.



2b. Positive trees are removed.



3. Herbicide applied via notch or cut stump method.
As recommended on label.



4. Trees with herbicide injury removed.



5. Adjacent trees sampled.



6. Samples sent to lab.



7. Positive trees removed. If more than 20%, remove whole block.



3. (Organic) Trees adjacent and 1 out from symptomatic trees sampled.



4. Samples sent to lab.



5. Positive trees removed. If more than 20%, remove whole block.

See treefruit.wsu.edu for tree removal information.

X-disease phytoplasma or Little cherry virus HAS been confirmed in block.

1. Scout teams walk blocks and mark suspect trees.

2. Symptomatic trees are removed.

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4. Trees with herbicide injury removed.

5. Adjacent trees sampled.

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7. Positive trees removed. If more than 20%, remove whole block.

3. (Organic) Trees adjacent and 1 out from symptomatic trees sampled.

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5. Positive trees removed. If more than 20%, remove whole block.

See treefruit.wsu.edu for tree removal information.

**Look at every
tree.**

**Look at both
sides of tree.**

“We want to find **new**
outbreaks so we have to look
at every tree.” - WA grower



Scouting team walking block one on each side of tree.



Scouting team using four-wheelers in LOW gear.



Where to sample

Trees with symptoms: Sample from symptomatic limbs. Samples only needed in non-confirmed blocks. With many symptomatic trees consider sending samples from a portion of suspect trees.



Trees with no symptoms: Sample from each leader.



Material to sample

Submit four five-inch cuttings from the diseased limb(s) including leaves, (fruit okay) and **FRUIT STEMS**.



When to sample

The week before harvest to mid-August.

What not to send

Old, dry, dead tissue.



Example Stemilt Hannah Walters' group works in teams with a lead scout. Scouts GPS tag and flag symptomatic trees. They send in a portion of symptomatic trees for laboratory confirmation to check accuracy for new scouts. For example, if they flag 20 trees, they send in samples for 10. If all 10 come back positive they remove all 20 flagged trees. For removal they use either the herbicide painted cut stump or "notch" drill and inject herbicide method. Walters says "We are finding X scattered randomly in blocks vs hot spots so it is important to look at all trees in a block." They consider age of trees and economics of block when deciding whether to remove a whole block.



H. Walters



Example Goldy Dale Goldy's scouts walk the block in the week before harvest. They find there are too many false negatives when scouting is done earlier. They look at every tree. "We want to find **new** outbreaks so we have to look at every tree." They remove symptomatic/ positive trees by first drilling and applying herbicide in holes and then cutting out dead trees. They find that timing for herbicide application is important. Trees treated in August die quickly. If more than 20% of the block is affected they remove the entire block.

Example GS Long Garrett Bishop and his group focus on spots identified by growers or fieldmen and then randomly scout at least 25% of entire block. Using quads in low gear (about 3 miles per hour) they look at the whole tree when scouting and sampling, especially concentrating on both small limbs off the main scaffold and the lower section of the tree that often seem to be symptomatic. The growers GS Long scout for remove trees using either the cut stump or notch (drill) herbicide method.



Example Zirkle Teah Smith and her crew scout in teams. Teams scout with one person on each side of the tree on four-wheelers in low gear looking at every tree. They flag trees with flagging tape that is labeled numerically and alphabetically (eg. Sample 22 is positive so the 8 trees around it are labeled as 22A, 22B, 22C, etc). They remove positive trees and sample from adjoining trees. If adjoining trees are positive, they are removed, and the next tree out sampled until trees are all negative. They remove trees by pulling trees, removing as many roots as possible. Generally, if more than 20-30% of the block is infected/ has been removed from LCD, the entire block is removed.



Packaging and Sending Samples

Keep tissue moist and cool. Old or dried tissue is more likely to have false negatives. Best to send samples early in the week.

For a list of labs visit

<http://treefruit.wsu.edu/labs-lchv2-xdp/>





REMOVE INFECTED TREES!

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Thank you to partners:

Washington State Tree Fruit Research
Commission

G.S. Long



For more information

treefruit.wsu.edu/crop-protection/disease-management/western-x/

<http://treefruit.wsu.edu/crop-protection/disease-management/little-cherry-disease/>

pnwhandbooks.org/plantdisease/host-disease/cherry-prunus-spp-x-disease