# Bacterial Canker Management

Bacterial canker infection has always been a concern when a new block of cherry trees is planted. Canker is of particular concern when those young blocks are located in higher precipitation areas such as the Willamette or Hood River Valleys. Historically, drier areas such as The Dalles and Mosier have had fewer problems with this disease. We have seen over the last few years that this trend continues to hold, and yet, with the increase in new plantings, there is an increase in canker incidence in all areas. What causes bacterial canker and how can the incidence of the disease be reduced?

### *Causal agent and disease form*

Bacterial canker is caused by the pathogen *Pseudomonas syringae*. The pathogen actually causes three different disease forms: the typical canker that affects trunks, branches and twigs, a dead bud form that kills buds in the spring and a leaf spot form. Since the leaf spot form is seldom a problem in the Mid-Columbia it will not be discussed here. However, dead bud and the canker form are present, with the canker form being the most prevalent.

### *Dead Bud*

Dead bud is usually first seen in the spring in the form of dying buds. Incidence of the disease is increased with frosty conditions. For this reason, low lying areas prone to frost damage and poor air circulation are the most common sites of this disease. As the disease progresses, both leaf and flower become infected. Cankers seldom form, but gumming may be produced.

### *Canker*

Vertically elongated cankers with associate gumming are the most common symptoms of bacterial canker. Although gumming is associated with bacterial canker, there are many causes for gumming in cherry trees. Cankers begin to appear in the winter and early spring and consist of a darkened and sunken area of the branch. Removing the bark exposes dark stripes in the wood. Girdled branches often die in the spring or summer.

### *Disease Development*

Growth and dissemination of the bacteria are favored by cool, wet weather. Wounds need to be present on the tree for infection to occur. Wounds can be caused by pruning cuts, frost damage or leaf scars that are present in the fall after the leaves drop. According to Dr. Bob Spotts, pathologist at the Mid-Columbia Agricultural Research and Extension Center, trees are most susceptible to infection their first two years after planting. Another disease, called *Cytospora* canker, a fungal disease, commonly infects trees as they

mature. Studies have shown that late fall and early winter pruning increase the incidence of bacterial canker compared to late spring pruning. By summer, there is a decreasing potential for infection. It may, therefore, be wise to prune infected blocks, or at-risk blocks during the summer to lessen the potential for infection.

When pruning, it is important to take weather conditions into consideration. Newly created wounds with the presence of rain are ideal for infection to take place. On pears, Spotts found that there was a direct correlation between disease infection and the time of introduction of inoculum after a pruning cut was made.

| **Time after pruning** | **Percent infection** |
|---|---|
| 0 hours | 8% |
| 24 hours | 2.3% |
| 72 hours | 0% |

Although we don't know for sure, it may be that these same time periods hold true for the incidence of rain after pruning. In other words, it would seem wise to stop pruning young cherry trees if rain is predicted within 72 hours of pruning.

Factors that predispose cherry trees to infection include wounds, frost damage, improper soil pH, poor nutrition, excess nitrogen, and nematodes. In addition, according to a study done by Spotts a number of years ago in Mosier, there is a direct relationship between higher infection levels and proximity to an old orchard.

Besides pruning cuts, one of the major causes of wounds on cherry trees is from winter injury. A number of years ago a young orchard in The Dalles area became severely infected after a harsh winter freeze. Trunks of young trees should be painted with a white latex paint to reduce the incidence of this type of injury.

*Pseudomonas* cells are present everywhere, however, the type of cover crop in an orchard does affect the population of the pathogen. Pseudomonas is more prevalent on grasses and dandelions than on clover, according to Spotts.

Last year Spotts released an 11-step program to help manage bacterial canker of sweet cherry. Control must integrate several techniques including the following:

1. Do not interplant new trees with old trees, which are major sources of *P. syringae*.

2. Keep irrigation water off the part of the trees above ground as much as possible for the first 2 or 3 years after planting. Consider withholding water in late summer so trees will "harden off" and not be as susceptible to low temperature injury in early winter.

3. Avoid all types of injury – mechanical, insect, frost. Paint all trunks white with latex paint to prevent winter injury. Adding copper to the paint is probably of little benefit.

4. Some studies show less bacterial canker when pruning is delayed until late spring, even as late as after flowering in May. Less disease also occurs when summer pruning is used. Prune only during dry weather if possible.

5. Remove and destroy branches and trees killed by *P. syringae* from the orchard.

6. Mazzard F12-1 is one of the most resistant rootstocks. Resistance of new rootstocks is unknown at this time. Sweet cherry scion cultivars generally are susceptible.

7. Locate cherry orchards in an area less likely to be affected by frost and slow drying conditions.

8. Provide optimal soil conditions for growth of cherries, including attention to pH and nutrition. Application of excess nitrogen, especially late in the growing season, will promote late season growth that is susceptible to low temperature injury in early winter, followed by bacterial infection.

9. Control weeds. They often support large populations of *P. syringae*, especially grasses. Clover and vetch ground covers support lower populations. Consider clean cultivation of row middles for the first 3 years.

10. Fixed copper products or Bordeaux 12-12-100, applied in October and January may help, but strains of *P. syringae* resistant to copper are widespread in the Mid-Columbia area.

11. Test for and control plant pathogenic nematodes before planting if needed. High populations of ring nematode have been associated with more bacterial canker.

## **References**:

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