

Special Statement from OSU on the mid-November Freeze
Preventing Insult after Freeze Injury

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Summary:

Can anything be done now to limit the damage from the mid-November freeze? Copper-based pesticides could be useful to prevent bacterial canker, but only IF the orchard and neighboring orchards do not have a history of copper use or resistance. Possible for The Dalles, not recommended for Hood River. The use of many other materials such as antibiotics, SAR materials or disinfectants would be a waste of money, especially during the winter months. Removing damaged and diseased wood this winter through pruning may help trees recover and slow or stop the spread of disease. Summer pruning in diseased blocks should be considered for the future.

In mid-November the Mid-Columbia area from Hood River to The Dalles experienced a very hard freeze before stone or pome fruit trees had lost leaves and accumulated significant cold hardiness. I visited within a day of this event and was astounded to see many trees with blackened leaves still attached to pears. The air was filled with a familiar smell of decaying leaves.

Many growers, consultants and county agents have been out in orchards to assess the damage. Cutting through buds has revealed blackened tissue indicating winter injury. Many flower buds, vegetative buds, spurs, shoots and limbs have been killed outright. The real extent of the problem may not be fully known until early spring. Buds that may look fine now could push out only to collapse within days from this injury. Damaged, poorly growing shoots may also collapse once the heat demands of the summer kick in.

As pathologists, we know that there are many other problems that can follow winter injury of this sort. Cracked trunks and limbs can be colonized by a whole host of organisms that result in weeping and oozing cankers. Cherry trees will exhibit heavy gummosis simply due to stress, without disease infection. However, bacterial canker of cherry is very common following a freeze event such as this one. In addition, all fruit trees from pome to stone fruits can become infected by a fungus call *Cytospora*. Those cankers are characterized by numerous black, pimple-like, spore-bearing structures in the dead tree tissue. These can be most easily seen in the spring. Also, grape growers will need to look for crown gall on surviving vines.

In all these cases management tactics are centered on prevention. Once the diseases take hold there is little that can be done to eliminate them from the trees. There are no silver bullets for these problems.

Can anything be done now to limit the damage?

There is nothing we can do to correct freeze injury. Dead plant tissue will remain dead no matter what you spray or how much you fertilize. Nevertheless, can we prevent some of these diseases on the surviving trees? Maybe.

We realize this is bad news. You have put a lot of effort into your orchards and we are here to support you through research and education. Many growers will want to take some kind

of action to limit the damage. Our goal is to discuss the options, which are few, and their effectiveness, which is doubtful. We do not come by this discussion lightly and respect your final actions and decisions.

Copper-based Pesticides

Short answer – maybe.

Long answer - Copper-based pesticides could be useful to prevent bacterial canker IF an orchard does not have a history of copper use. Possible for The Dalles, not recommended for Hood River.

Use of copper-based pesticides has been common in the Hood River area but not nearly as common in The Dalles. Dr. Ken Johnson and Dr. Virginia Stockwell have tested isolates of bacteria from each region. Bacteria that cause canker on cherry from The Dalles seem to be mostly sensitive to copper, with a few exceptions. By comparison, similar bacteria from cherry cankers in the Hood River area are mostly resistant to copper.

Dr. Stockwell examined weather records before and after the freeze event. She indicates that periods of rain and warm weather before and after the freeze may have supported the growth and distribution of these bacteria. Use of copper-based materials could be considered in The Dalles to reduce populations of canker causing bacteria.

Copper-based pesticides could make matters worse. Research by Dr. Bob Spotts in Hood River and Dr. Jay Pscheidt in western Oregon has shown copper-based treatments to increase disease by these bacteria over the non-treated check. In other words, doing nothing had lower disease than applications of copper-based pesticides. Bacteria in these trials were resistant to copper.

The active ingredient in copper-based pesticides is the copper ion. Copper is generally not very soluble. There is research to indicate that the addition of certain materials, such as mancozeb, with copper-based pesticides helps boost the final concentration of copper ion in solution. This boost in copper ion concentration can be enough to reduce resistant populations of bacteria. However, these bacteria can easily adapt and become resistant to the higher concentration.

ManKocide is a product that is registered for pome fruit and already comes prepackaged with both copper hydroxide and mancozeb. Use could be considered in the Hood River area for blossom blast. It is **not** registered for use on cherry.

Although copper-based materials are also active on fungi, there is no research to support its use against *Cytospora* canker.

Antibiotics

Short and long answer – no.

Antibiotics have been useful to manage fire blight, a bacterial disease of pome fruit. This disease has clearly defined critical periods for control during pome fruit flowering. Antibiotics have a residual effect for about 3 days after application. They would not be useful at this time during our long dormant season for the various bacterial problems that may develop. Use during flowering may be helpful for blossom blast management.

There is a new antibiotic on the market this coming year for fire blight management called Kasumin. Dr. Johnson indicates that copper resistant *Pseudomonas* bacteria were a little less sensitive to this antibiotic.

Cherry – in the first place there are no antibiotic registrations. Even if there were, antibiotics are unlikely to be effective.

SAR materials

Short and long answer – no.

Many materials claim to have “Systemic Acquired Resistance” (SAR) activity. The effect can be shown by doing something to one part of the plant and having defensive products form there and in other parts of the plant. There has been more research on this phenomenon in annual plants and it has been harder to show in perennial plants. In theory, SAR is an active defense mechanism that can be stimulated by applying various products.

Materials that show a strong SAR effect require warm weather and actively growing green tissue to be effective. Certainly now is the wrong time to even consider these materials. Even this spring, the available and various registered materials would have doubtful efficacy.

Disinfectants

Short and long answer – no.

Over the years we have had many questions about disinfectants (such as the peroxides Zeritol or OxiDate) for management of bacterial diseases. Popular materials include peroxides, quaternary ammonias, bleach, and various alcohols. Although these materials are good to clean, oxidize and kill organisms from surfaces such as pruning shearers, they are not like other pesticides you would use on plants. The residual activity is very low and measured in minutes rather than days. Consensus among researchers is that these products would be ineffective no matter when you might use them on trees.

The results of the mid-November freeze and disease shock effects will develop this coming year. There is no silver bullet to reverse these effects or limit damage. Growers will be tempted to use all sorts of materials that have marginal if any activity on the problems that develop. All we can suggest at this point is that copper-based materials may be useful in orchards that do not have a history of copper use. The use of many other materials we feel would be a waste of money adding insult to freeze injury.

Pruning

Short answer – maybe

Long answer – it may be possible to prune out damaged or infected branches if the infection is not located in or immediately adjacent to the trunk. Where possible prune at least 12 inches below cankers or gummosis. Be careful to prune during dry periods so as not to further spread disease. In order for bacterial canker to spread, free water must be present on an open wound.

Damaged and infected wood should be pruned out this year during the dormant season. However, it may be prudent to consider switching to a summer pruning regime in diseased blocks to reduce the potential for canker spread in the future.

Summary:

In November, a severe hard freeze hit orchards in the Mid-Columbia region before fruit trees entered dormancy and cold hardiness. Can anything be done to limit the damage from the mid-November freeze? Copper-based pesticides could be useful to prevent bacterial canker, but only if the orchard and neighboring orchards do not have a history of copper use or resistance. The use of many other materials such as antibiotics, SAR materials or disinfectants would be a waste of money, especially during the winter months. Removing damaged and diseased wood this winter through pruning may help trees recover and slow or stop the spread of disease. Summer pruning in diseased blocks should be considered.