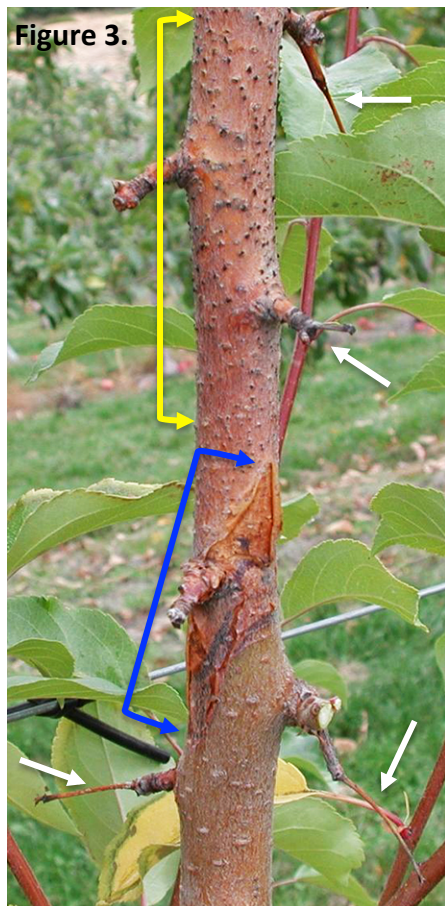


Guidelines on Pruning 'Manchurian' Crabapple for Fruit Rot Control

By: Chang-Lin Xiao, Ph.D., USDA-ARS, San Joaquin Valley Agricultural Sciences Center, Parlier, CA and Yong-Ki (Richard) Kim, Ph.D., Pace International, Wapato, WA

Produced by: Wendy Jones, M.S., WSU, Tree Fruit Research and Extension Center, Wenatchee, WA
Developed for: Northwest Fruit Exporters and Northwest Horticultural Council, Yakima, WA

Disease Symptoms on Fruit: Sphaeropsis rot (*Sphaeropsis pyriputrescens*) and speck rot (*Phacidiopycnis washingtonensis*) are two postharvest fungal fruit rot diseases of apple. Both originate from fruit infection in the orchard. Symptoms of Sphaeropsis rot manifest as a stem-end rot, a calyx-end rot (Figure 1) or both and include light brown to brown tissue in the decayed area that may darken with age. As the disease advances, the peel color of the entire decayed fruit may be similar or vary across the fruit. Fruit with Sphaeropsis rot have a distinct "bandage-like" odor, especially when the affected flesh is cut. Speck rot symptoms can also occur as a stem-end rot or as a calyx-end rot (Figure 2). For both Sphaeropsis rot and speck rot, the affected fruit tissue is spongy to firm, which is not differentiable from gray mold caused by *Botrytis cinerea* and not readily



separable from the healthy tissue. The coloration of the decayed areas varies from light brown to dark brown or occasionally black. Speck rot is so named because of the brown to black specks with white to light tan centers that may appear around the lenticels, especially on red apple cultivars.

Sources of Disease Inoculum in Apple Orchards: The sources of inoculum for both *S. pyriputrescens* and *P. washingtonensis* are diseased or dead plant tissue in affected orchards. Cankers caused by *S. pyriputrescens* and *P. washingtonensis* are not common on apple trees in commercial orchards in Washington State, but the 'Manchurian' crabapple used as pollinizers in apple orchards is highly susceptible to both fungal pathogens, causing twig dieback and cankers (Figure 3). The fungi can also infect crabapple fruit (Figure 4). Both fungi can produce small black dots (fruiting bodies) to form on infected 'Manchurian' twigs and tree branches. Fruiting bodies contain millions of spores that serve as inoculum for fruit infection. Rain, irrigation water or over-tree cooling can spread the spores to nearby apple trees and fruit. Although apple fruit infection occurs in the orchard, fruit rot symptoms develop during storage or at the market.

Figure 3. 'Manchurian' crabapple tree showing signs of twig dieback (white arrows), canker (between blue arrows) and black fruiting bodies (between yellow arrows).

Figure 4. The *Sphaeropsis* rot and speck rot fungi can also infect crabapple fruit and form fruiting bodies on mummified fruit left hanging on trees. This is where the highest concentration of inoculum originates.



Pruning Recommendations: Since the major source of inoculum comes from infected crabapple (both dead tissues of trees and fruit mummies), pruning is highly recommended to reduce infection by either *S. pyriputrescens* or *P. washingtonensis*. Detailed pruning to remove all infected twigs, branches and fruit mummies will significantly reduce infection by these pathogens.

Any approach to pruning that still leaves a considerable amount of infected tissues should be reconsidered. However, any amount of pruning is preferable to leaving trees unpruned (Figure 5).



Figure 5.

Additional Orchard Control

Recommendations: Overhead irrigation should be avoided and over-tree cooling limited in duration to only the amount necessary for sunburn prevention. However, any amount of water might be enough to cause infection, if inoculum is present in the orchard.

Preharvest fungicides such as Ziram, Pristine or Topsin M applied near harvest as a ground application reduce Speck rot and *Sphaeropsis* rot.

A postharvest fungicide drench with Penbotec (pyrimethanil), Scholar (fludioxonil) or Mertect (thiabendazole) is very effective in controlling both of these diseases. In general, these three postharvest fungicide treatments are more effective than the preharvest fungicide sprays.

Figure 5. Unpruned infected 'Manchurian' crabapple trees are a major source of fungal inoculum for *Sphaeropsis* rot and speck rot. This image shows an infected crabapple tree with several mummified fruit and dead infected tissues. Detailed hand pruning can significantly reduce the amount of orchard inoculum. **Inset:** Close-up of an infected 'Manchurian' branch. Yellow arrow indicates the spread of pycnidia (fruiting bodies); Blue arrows show the boundaries of a canker.