

(revision date:4/11/2018)

## ***Apple: Anthracnose and Bull's-eye rot***

*Use Integrated Pest Management (IPM) for successful plant problem management.*

### ***Biology***

Apple anthracnose is a fungal disease that impacts apple production in regions with mild year-round temperatures, abundant winter rains, and cool-humid summers. Two disease problems result from this fungal group: anthracnose cankers on trees and a post-harvest fruit rot known as Bull's-eye rot. Anthracnose canker typically affects twigs and small branches but can damage tree trunks and large limbs. Initial infection usually starts fall but can continue throughout winter and spring if weather is mild and moist. Young cankers appear as small reddish-brown areas and are most easily observed when bark is wet. Cankers elongate during spring reaching full size (1-10" long) by midsummer. Cream-colored fungal sporulation may be observed. The bark usually splits away around the canker edge. The dead tissue in the canker sloughs off leaving "fiddle-strings" of bark across the canker before eventually all bark tissue over the canker is gone. Spores mature in late summer/early fall and can spread by rain and wind to other parts of the tree or to nearby apple trees. The fungus survives each year in cankered limbs. These cankers also serve as the source of infection for the fruit rot phase of the disease. When it rains before and during fall harvest time, the fungus may enter fruit through natural openings, such as the gas-exchange pores known as lenticels, or through wounds. Damage first appears on the fruit skin as circular, flat, or slightly sunken spots that are brown with a pale center. After a 4-7 month period of fruit storage, fungal fruiting bodies may develop in the center, often in concentric rings giving the appearance of a bull's eye. The decayed fruit tissue is somewhat mealy and firm, and does not separate easily from healthy tissue.

### ***Management Options***

#### **Non-Chemical Management**

- ~ All apple cultivars are susceptible; avoid use of the highly susceptible cultivars 'Akane', 'Baldwin', 'Chehalis', 'Elstar', 'Empire', 'Gala', 'Gravenstein', 'Melrose', 'Sinta', and 'Spartan'.
- ~ Prune out cankers and destroy infected wood. Canker removal should be done in dry weather year-round.
- ~ To remove cankers, use a pruning knife to cut out the canker and several inches above and below canker margin. Remove all brown strands (infected tissue) found in the sapwood tissue. Sterilize pruning knife after each canker removal.
- ~ Trees that are heavily infested (having 4 or more cankers on the majority of branches and trunk) should be removed and burned.

***Select non-chemical management options as your first choice!***

#### **Chemical Management**

***IMPORTANT: Visit Home and Garden Fact Sheets for more information on using pesticides***

Chemical treatments are most effective if applied before disease appears. In western Washington, where the canker phase of this disease can kill apple trees, a year-round spray program is needed to prevent disease from becoming established. Application of fungicides may not be effective if not done in conjunction with canker removal.

If Bull's-eye rot is a problem, make fungicide applications pre-harvest according to label instructions. Homeowners should not make foliar applications to trees over 10 ft tall. Consult a commercial pesticide applicator for treatment of trees and shrubs over 10 ft. tall.

**Listed below are examples of pesticides that are legal in Washington. Always read and follow all label directions.**

- ~ Bonide Copper Fungicide Spray or Dust RTU [Organic]
  - active ingredient: basic copper sulfate
  - EPA reg no: 4-58

- ~ Bonide Liquid Copper Fungicide Conc/Organic Gardening
  - *active ingredient: copper octanoate*
  - *EPA reg no: 67702-2-4*
- ~ Captan 50% WP Fruit & Ornamental
  - *active ingredient: captan*
  - *EPA reg no: 4-459*
- ~ Monterey Liqui-Cop Copper Fungicidal Garden Spray
  - *active ingredient: copper-ammonia complex*
  - *EPA reg no: 54705-7*
- ~ Soap-Shield Flowable Liquid Copper Fungicide [Organic]
  - *active ingredient: copper octanoate*
  - *EPA reg no: 67702-2-56872*
- ~ This list may not include all products registered for this use.

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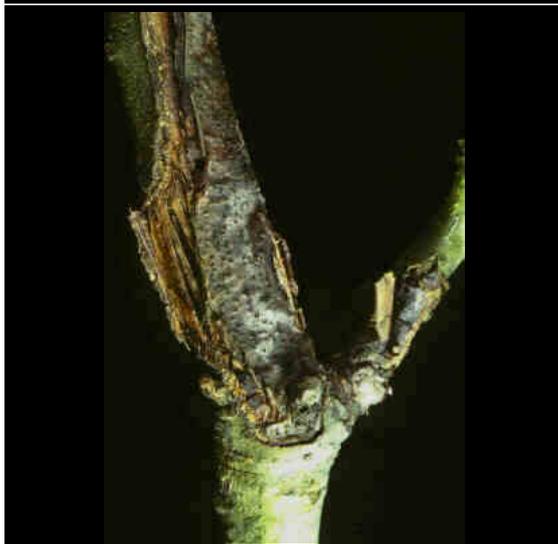
*Images*



*~ Caption: Apple anthracnose in early spring  
~ Photo by: R.S. Byther*



*~ Caption: Apple anthracnose in late spring and summer  
~ Photo by: R.S. Byther*



*~ Caption: Apple anthracnose in late summer, fall, and winter  
~ Photo by: R.S. Byther*