

Phytophthora Crown and Collar Rot of Fruit Trees

Plant Disease Control No. 6 Revised 2000

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Above ground symptoms of a tree infected with Phytophthora. The lower (rootstock) portion of the tree has been infected with Phytophthora.



(courtesy: S. V. Thomson, Utah State University)

Do You Know?

Most deciduous fruit and nut species are affected by a disease known as crown rot, collar rot, or Phytophthora collar rot. All species of stone and pome fruits are affected. It is a serious and costly disease, frequently killing trees of 5-7 years of age, just as they are beginning to bear fruit.

The crown rot disease on apples and pears is caused by *Phytophthora cactorum*. The disease on stone fruits is caused by several closely related species of *Phytophthora*: *P. cambivora*, *P. megasperma*, *P. dreschleri* and *P. syringae*. These fungi are more active in soils with high moisture and in temperatures ranging from 55 F- 70 F (13 to 21 C).



(courtesy: S. V. Thomson, Utah State University)

Characteristic browning of crown tissue when a Phytophthora infection has occurred.

SYMPTOMS

Collar rot is observed as dead areas on the trunk called cankers between the soil line and crown roots. Cankers are difficult to detect when young, but as they enlarge, they darken and become slightly depressed. To be observed, the soil must be removed from the trunk of the tree. These cankers may only partially girdle the tree but if conditions remain favorable for the fungus, they will completely girdle and kill the tree.

This disease is not easily diagnosed from symptoms in the top of the tree. Scattered yellow leaves occur on trees in mid-season. In late September, affected trees often develop a reddish or purple cast in the foliage. Infected trees usually have sparse foliage and low vigor. Foliar symptoms may appear only on branches directly above the canker, while the remainder of the tree appears normal and continues to bear fruit. Some trees may be diseased, but remain alive for 2 to 3 years, while others will be killed within a single summer.

Collar rot can be found in young orchards as well as older plantings. It is especially serious when replanting in old orchard sites. Irrigation greatly influences the disease since the fungus is a water mold. It is more serious in heavy,



(courtesy: S. V. Thomson, Utah State University)

Roots and Rootstock infected with Phytophthora. The fungus kills the bark tissue and small roots making them dark brown or black.

poorly drained soils than in light, well-drained soils, although it can occur in almost any soil when improperly irrigated.

The fungus can be introduced into an orchard on planting stock, irrigation water or on contaminated farm implements. Other root problems may cause similar above ground symptoms and thus confuse diagnosis. Winter injury may predispose the tree to invasion by secondary invaders. Mice or other rodents may girdle the tree at the soil line causing above-ground symptoms similar to root rot. The only positive diagnosis is the appearance of the cankers and isolation of the fungus.

CONTROL

Collar rot is difficult to control because it is an erratic disease and there is incomplete knowledge about the disease cycle. When infections are discovered, it is usually too late to eradicate the disease and save the tree. The following control practices should be used to prevent or decrease collar rot:

1. Choose resistant varieties and rootstocks.

This is the most effective means of control. Susceptible rootstocks should not be planted where the soil is heavy or poorly drained. The most susceptible apple rootstocks are Lodi, Grimes Golden and Duchess. Golden Delicious, Jonathan, McIntosh and Rome Beauty are moderately resistant. Red Delicious, Wealthy and Winesap are considered to have good resistance. Seedling Rootstocks appear somewhat tolerant of collar rot.

Dwarfing apple rootstocks vary on their susceptibility to collar rot. East Malling (M) rootstocks M-9 and M-26 are considered reasonably resistant. Malling-Merton (MM) rootstocks MM-104 and MM-106 are quite susceptible. M-7 and M-111 are intermediate in resistance. Mahleb rootstock is quite susceptible as a sweet or sour cherry rootstock.

2. Select light soils with good drainage for orchard sites

Collar rot is most prevalent in sites that are low or have poorly drained soils. Do not allow a basin to form around the trunk or place trickle irrigation outlets so that the tree base is continually wet. Always channel water away from the trunk. Keep irrigation periods to less than 8-hour runs. Plant trees on raised beds.

3. Plant Shallow

Do not plant trees so that the graft union is below the soil line. This results in increased collar rot and may allow the scion to establish roots thus resulting in loss of dwarfing or lack of tree uniformity.

4. Plant vigorous Phytophthora-free trees

Reject trees with discolored or damaged roots. Purchase trees from a reputable nursery with a good history of quality trees.

5. Provide tree support

Young trees will “rock” in the wind, resulting in an opening or a well around the tree which collects water. This leads to increased cold injury and collar rot.

6. Preventive

Applications of Aliette or Ridomil Gold EC in conjunction with good cultural practices will aid in controlling Phytophthora root rot.

7. Control after infection

Limited success has been obtained in arresting or eradicating the disease by following these procedures:

a. Inarch one-year-old whips of a resistant variety into the trunk well above the diseased area. This is only effective if less than 30-50% of the trunk is affected.

b. Remove soil from around the base of infected trees to expose the cankered area. Leave the trunk area exposed to permit drying of the infected area and prevent further development of the disease. Spray the lower trunk with a fixed copper fungicide (50% metallic copper), using 2 to 3 tablespoons of fungicide per gallon of water. Refill the area around the trunk with fresh soil in the late autumn.

c. Reduce frequency or length of irrigation if used in excess. Soil saturated for over 36 hours is conducive to disease, especially when temperatures are 60-70 F.

d. Treat with the systemic fungicides Ridomil Gold EC or Aliette. Contact your county agent for new registrations and rates.

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