34. Brown Rot of Stone Fruits

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A common and destructive disease of stone fruits called brown rot, blossom blight, twig blight, and/or brown rot canker is caused by the fungus *Monilinia fructicola* (*Sclerotina fructicola*).

Hosts and Distribution

All of the commonly cultivated stone fruits, including cherry, apricot, and plum, are susceptible. The disease is less important on apple and pear, and of minor importance on flowering almond, cherry-laurel, chokecherry, flowering quince, and western sand-cherry.

While brown rot is world-wide, it is of little importance in regions where rainfall is low. Severe epidemics are common in the high-rainfall peach-growing areas of the Southeast and along the Atlantic Seaboard, but may also occur elsewhere when moist conditions prevail during fruit ripening.

Figure 34–1. Mummified fruit with adjacent non-infected fruit clinging to the branch.

Figure 34–2. Formation of ash-gray mold on surface of infected fruits.

Symptoms and Signs

Brown rot is usually first seen as the fruit approaches maturity. Small, circular, light brown areas of decay appear on the surface of the fruit, expand rapidly, and within a few hours may encompass the entire fruit. A day or so later the fruits rot. Some fall to the ground, while others remain attached to the tree, where they dry and become mummified (fig. 34–1). In warm, wet, humid weather, tufts of ash-gray mold develop over the surface of the rotting fruits (fig. 34–2). These fungal masses help distinguish brown rot from other diseases.

Flower blossoms, fruit spurs, woody shoots, and immature fruit are also attacked (fig. 34–3). Infected blossoms wilt, turn brown, and persist into summer. The fungus may progress downward into the flower cluster base and into the fruit spur (fig. 34–4). When the fungus grows into woody tissue, small cankers are formed. They enlarge and may girdle the branch or twig, killing terminal growth. Droplets of resinous gum may accompany the blighted spurs and cankers.

Disease Cycle

The brown rot fungus overwinters in mummified fruits, branch or twig cankers, and infected peduncles. In spring, when fruit buds are opening, small cupshaped apothecia arise from the mummies beneath infected trees (fig. 34–5). When these apothecia are wetted, spores produced within them are ejected into the air and carried by wind to infect blossoms or new shoots.

Figure 34–3. Infected shoot and immature fruit.

Figure 34-4. Infected flower cluster and fruit spur.

Infection may also arise from a second type of spore produced later in the season on dead blossoms, in spur or twig cankers, or on attached mummies. These spores are also carried by wind or splashing rain to infect ripening green fruit. Infection may occur directly through the cuticle or through natural openings. Wounded fruit is infected much more rapidly than unwounded fruit. Injuries caused by the stink bug, plum curculio, and other insects are frequently avenues of entrance for the brown rot fungus.

Warm, wet, humid weather favors rapid development of brown rot. The time of wetting necessary for blossom infection decreases from 18 hours at 50°F to 5 hours at 77°F. Infection rate decreases above 80°F and below 55°F, but may continue at temperatures as low as 40°F. Under optimum conditions, mature fruit decays in 36 to 48 hours.

Figure 34-5. Close up of infected fruit and developing apothecium.

Damage

Brown rot is economically important in commercial and home orchards. The disease reduces yields by damaging blossoms, twigs, and fruit. After harvest, fruit decomposition poses a constant threat in storage and transit.

Control

Brown rot control involves integrating several disease prevention methods. Control starts with removal of all fruit, mummies, and blighted twigs from trees in the fall. This procedure reduces the amount of brown rot fungus surviving the winter. Cultivate around trees before first bloom to reduce the early spring spore potential. Prune trees to promote good air circulation.

Fungicidal applications at blossom time and pre-harvest time are also important (table 34–1). Blossom blight must be avoided to insure against fruit infection later in the season. The first spray should be applied when the pistil tips extend above the flowers, even unopened flowers. If warm, wet weather prevails, spray every 4 to 5 days until one week after petal drop. Begin pre-harvest sprays about 3 weeks before harvest to control brown rot on ripening fruit. If brown rot has built up, the pre-harvest sprays should be started earlier. Applications should be made at closer than weekly intervals if weather is warm and wet as the fruit colors.

Plant fruit trees in a sunny, open site with well-drained soil away from frost pockets. Plant resistant cultivars when available. Do not plant near wild fruit trees because they may be a source of inoculum. Control fruit injury (e.g. insect or mechanical damage) to prevent early infection of fruit. Apply fungicides if such injury occurs. Excess nitrogen application may increase infection.

Selected References

Byrde, R. J. W.; Willetts, H. J. The brown rot fungi of fruit, their biology and control. New York: Pergamon Press; 1977. 171 p.

Zehr, Eldon I. Control of brown rot in peach orchards. Plant Disease. 66: 1101–1105; 1982.

Table 34-1. Recommended fungicides for brown rot control.

Chemical	Rate/gal (3.8 L)	Minimum number of days from last application until harvest			
		Apricots	Cherries	Peaches	Plums & Prunes
Benomyl, 50% WP (Benlate, Benomyl)	3/4 - 1 1/2 Tbs[1] (5.4 to 10.8 gm)	0	0	0	0
Captan, 50% WP (Captan, Orthocide)	3 1/3 Tbs (28 gm)	0	0	1	0
Sulfur, 80-92% WP (Flotox)	2 1/2 Tbs (19 gm)	—[2]	0	0	0
Ferbam, 76% WP (Fermate)	1 Tbs (6.8 gm)	—	0	21	7

[1]Tbs = tablespoonsful [2]— = not registered