

Brown Rot of Stone Fruits

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Brown rot, caused by *Monilinia spp.*, is a common disease affecting stone fruits throughout the world. There are a number of *Monilinia* species that cause brown rot, but *Monilinia fructicola* is the most common species affecting trees in the United States. In addition to causing pre- and post-harvest brown rot of fruit, *M. fructicola* can cause blossom blight and stem canker. Cherries, apricots, peaches, and plums are all susceptible to the pathogen.

High humidity, rainfall, and warm temperatures favor the development and spread of the disease. An active management strategy for controlling the pathogen, involving both preventive and responsive measures, is recommended in regions with a climate conducive to the disease.

Symptoms and Transmission

The fungus overwinters in infected fruit and twigs from the previous year. In the spring, fungal spores are spread by wind and rain splash and can infect flowers. The infected blooms turn black, and tan/buff spores appear on the dying tissue.

Blossom blight in the spring increases the likelihood that fruit infection will follow. Young, green fruit is generally not susceptible to infection unless injured or thinned and left on the ground. But as fruit develops color and ripens, it becomes increasingly susceptible to infection. As the fruit infections begin, the amount of fungal spores builds, increasing disease pressure as the season progresses. Consequently, the most destructive infection period occurs just before harvest. Infected

fruit may exhibit symptoms quickly or the infection may remain latent, sometimes until after harvest.

Fruit lesions begin as light brown, circular spots on the fruit surface. The spots enlarge and tan/buff clusters of spores develop, often in concentric rings (Fig. 1). Infected fruit eventually completely rots, turns a tan to brown color, shrivels (known as mummies), and may remain attached to the tree or drop to the ground (Fig. 2).

Blossom and fruit infections can spread within tissues to infect stems, resulting in depressed, dark-colored, elliptical cankers, often producing gum and sometimes spores. When stem cankers girdle or encircle the stem, they disrupt the flow of water and nutrients from the root to the stem, leading to twig dieback. Leaves will remain attached to the infected stem for a few weeks. The pathogen can overwinter in retained blossoms, stem tissues, and in infected fruit mummies that have fallen or remain on the tree, continuing the disease cycle from year to year.



Figure 1. Lesion development and spore production on a brown rot-infected peach. Source: Molly Giesbrecht, Texas A&M AgriLife Extension Service, Bugwood.org



Figure 2. Fruit mummy from previous year remaining on the tree. Source: Molly Giesbrecht, Texas A&M AgriLife Extension Service, Bugwood.org

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Control

Many fungicides are labeled for brown rot, including azoxystrobin, benomyl, chlorothalonil, copper sulfate, fenbuconazole, iprodione, myclobutanil, propiconazole, sulfur, thiophanate-methyl, triforine, and vinclozolin. It takes a combination of cultural and chemical control practices to effectively manage this disease.

Cultural practices:

- Remove infected and injured fruit during and following each growing season.
- Prune any cankered or dead stem and branch tissue to reduce the inoculum load (the amount of pathogen in the infected tree) and prevent out-breaks.
- Improve air circulation by pruning branches and thinning fruit so that ripening fruit do not touch one another. This helps reduce wet conditions on the fruit, decreasing the probability and/or severity of infection.
- Do not leave thinned fruit on the ground since they may be colonized by the pathogen and contribute to the inoculum load (Fig. 3).
- Choose more resistant peach varieties such as Elberta, Glohaven, and Babygold No. 5.

Chemical control practices:

- Alternate between chemicals in different Fungicide Resistance Action Committee (FRAC) groups with different modes of action (the way a particular fungicide interacts with the pathogen to kill it). This helps avoid resistance to fungicides because of repeated applications of the same one. (See www.frac.info/ for the annual FRAC code list.)



Figure 3. Brown rot-infected fruit on the orchard floor. Source: Molly Giesbrecht, Texas A&M AgriLife Extension Service, Bugwood.org

- Apply fungicide during bloom and just before harvest. A preventive treatment just before bloom, when pink begins to show out of the buds, may also be needed, particularly if weather conditions favor the development of the disease.
- Evaluate the need for additional applications throughout the season based on weather conditions, disease symptoms, and the fungicide(s) being used.

Post-harvest control measures:

- Carefully handle fruit during and after harvest to prevent bruising or other injury.
- Store fruit in a cold environment.
- Treat with fungicides and biological control agents, including certain strains of *Pseudomonas* and *Bacillus spp.*, to protect against post-harvest rot.

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