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Brown Rot on Tree Fruit in the Home Orchard

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Brown rot, caused by the fungus, *Monilinia fructicola*, is a common and destructive disease of stone fruit, a closely related group of trees that include peach, nectarine, apricot, plum, and cherry. Another type of brown rot, European brown rot, caused by *Monilinia laxa*, appears to be limited to sour cherries in some northern regions of the Midwest, but has not been found in Indiana.

Photo by Janna Beckerman

Figure 1. *Early infections of the fungus that causes brown rot appear as soft, brown spots.*

Symptoms and Signs

Infection by the brown rot fungus can cause blossom and twig blight, cankers, and fruit rot on all members of the stone fruit group. Symptoms first appear in the spring as blossoms become infected. Diseased flowers wilt and turn brown, but remain attached to the tree. The fungus may produce masses of tan spores on the dead blossoms. Flower infections may spread to both new growth and spurs, causing cankers and shoot death as the fungus spreads into twigs.

Young fruit is normally resistant to brown rot but can become infected through wounds. As fruit matures, it becomes more susceptible to infection, even in the absence of wounds. Fruit infections appear as soft, brown spots (Figure 1). The spots expand rapidly and become covered with powdery, tan spores (Figure 2). Infec-

Photo by Steven Goodwin

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Figure 2. *Within days of infection, the brown rot fungus colonizes infected fruit, as shown in this plum (left) and cherry (middle). Eventually, the entire fruit can become covered in spores, as shown in this peach (right).*

Photo by Janna Beckerman

Figure 3. *Brown rot infections can rapidly spread from infected blossoms or fruit into adjacent twigs and branches.*

Photos by Janna Beckerman

Figure 4. *Early brown rot infections can infect ripe and still ripening fruit, as in this cherry (left). A "mummy," or rotted fruit, can remain attached to the tree and be a source of infection for subsequent years.*

Photo by Janna Beckerman

Figure 5. *Without proper management, losses from brown rot infection can be 100 percent.*

tion can spread into adjacent branches, causing dieback or death (Figure 3).

An entire peach can be rotted in as little as two days, after which it shrinks into a wrinkled "mummy" (Figure 4). Rotted fruit and mummies may remain on the tree or fall to the ground (Figure 5). During harvest, injured fruit are easily colonized and can rot within a few days.

Disease Cycle

The brown rot fungus survives the winter primarily in mummified fruits, but also survives in twig and branch cankers. During blossom time, mummified fruit on the ground develop a multitude of small, tan, wineglass-shaped structures called apothecia. The insides of these apothecia are lined with thousands of sacs (asci) filled with spores that are forcibly discharged with changes in wind and barometric pressure.

Spores that land on wet blossoms or new shoots will infect if they remain wet for longer than five hours. Infected blossoms wilt and powdery masses of tan spores (conidia), develop on the flower shuck. The infection can progress from the flower into the spur, then the twig, where it forms a canker. Conidia continue to be produced throughout early summer to infect injured and ripening fruit. Wet weather and temperatures ranging from 60°F to 70°F are most favorable for disease development.

Management

It is important to recognize that the spores of this fungus are everywhere, and that any type of injury to ripening fruit (insects, hail, twig rubs, picking injuries) will provide an entry point for the brown rot fungus. Upon harvest, immediately cool, refrigerate, or process fruit.

The key to managing this disease is to keep spore numbers low by good sanitation practices. Promptly remove and destroy fallen and rotted fruit. Remove any mummies remaining on the tree should as well. Prune out cankers in late winter, during the dormant season, and remove any wild (cherry or plum) or neglected stone fruit trees that can serve as reservoirs for the disease.

Resistance

Babygold No. 5, Elberta, and Glohaven are the only peach varieties with reported resistance to brown rot. Most commonly grown stone fruit in the Midwest vary from susceptible to highly susceptible. In order of brown rot susceptibility, apricots are extremely susceptible to brown rot, nectarine is more susceptible than peach, Japanese plum is more susceptible than European varieties and hybrids, and sweet cherry is more susceptible than pie cherry.

In the absence of reliably resistant cultivars, fungicides are an integral part of brown rot disease management for susceptible hosts. In order to successfully control this disease, a fungicide spray program must begin at bloom and continue throughout the growing season for those stone fruits highly susceptible to brown rot (see table below).

Fungicides Labeled for Brown Rot Control in the Home Orchard

Common Name	Trade Name
lime-sulfur	PolySul®, Bonide Lime Sulfur®[1]
chlorothalonil	Bravo®[2]
captan	Captan 50W®
thiophanate methyl	Cleary's 3336®
myclobutanil	Immunox®

NOTE:
[1] *Some formulations of lime sulphur are acceptable for organic disease control.*
[2] *Do not use after shuck-split.*

Reference to products in this publication is not intended to be an endorsement to the exclusion of others that may be similar. Persons using such products assume responsibility for their use in accordance with current directions of the manufacturer.