

## Brown Rot in Stone Fruit Monillinia fruticola

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Brown rot (*Monillinia fruticola*) is a major disease of stone fruits. All stone fruit (i.e., cherries, plums, apricots, nectarines, peaches) is susceptible to this disease, with sweet cherries being the most susceptible. As the fruit ripens and starts changing color, it becomes more susceptible to infection.

## Disease development

Warm, wet and/or humid weather is conducive to brown rot development. Any type of injury, whether it be insect damage, hail injury, bird pecks, bruised and/or cracked fruit, etc., becomes an opportune entry point for fungal invasion. On the fruit, brown rot infection starts as soft brown spots. These spots rapidly develop into lesions covered with powdery masses of creamy-tan colored conidia spores. Under favorable conditions, it can take only a few days for an entire fruit to rot (Figures 1 and 2). The fungal infection can spread to the adjacent limb and cause gumming. Mature and immature rotted fruit dries out and may stay attached to the branch as mummified fruit (also referred to as mummies) that will become a source of conidia and future infections.

## Disease biology

Blossom infections

Brown rot overwinters in mummies and infected limbs either on the tree or on the orchard floor.

Conidia from the sporulating mummies and infected limbs are disseminated by splashing and wind-driven rain. Mature



Figure 1. Brown rot on green fruit. (Photo credit: M. Danilovich)



Figure 2. Brown rot on maturing fruit. (Photo credit: M. Danilovich)

ascospores from tiny mushroom-like fungal structures are discharged and carried by the wind onto the blossoms. The optimum temperature for blossom blight development is 68 to 77 degrees Fahrenheit. Under these conditions,

Fruit infections Disease	the presence of water film on the blossoms for only five hours will result in infection. Fruit injured by insects, mechanical punctures and bruises are more prone to brown rot infection. However, even intact, uninjured fruit can be infected by brown rot spores. Humid, warm weather will facilitate disease development (Figure 3). As with any disease, sanitation is one of the meeting of the meet
management	of the most important steps in reducing the inoculum and disease pressure. Whenever possible, mummified fruit and gummed twigs and branches should be removed. In an attempt to prevent and/or minimize the conidia development on the fruit dropped by thinning, it is recommended to thin peaches and plums before the pit hardens since fruit without a hardened pit takes less time to decompose. Preventing insect damage (i.e., plum curculio, oriental fruit moth, plant bugs) to the fruit is essential for minimizing disease outbreaks.
Organic options	Fungicides can be effective in controlling brown rot. First, spray copper- containing products during delayed dormant to provide slight suppression of brown rot. Next, apply sulfur or sulfur-containing fungicides. Newer research shows that sulfur mixed with Surround WP Crop Protection is controlling brown rot better than sulfur alone.
	Surround (kaolin clay) also is a good deterrent for insects. Surround should not be used past the 1-inch diameter stage of fruit development because the product leaves heavy residue that weathers very slowly.
	Azomite is a micronized sulfur plus basalt rock dust mixture that could be used as an alternative material for brown rot control. If sulfur is used during high temperatures (>80 degrees Fahrenheit), fruit russeting and yield reduction may occur. Sulfur applications within 14 days of an oil application are potentially poisonous to the plant (phytotoxic).
	Whenever applying pesticides, make sure to follow label recommendations for using protective gear. When working with sulfur, apply extra caution since it is considered a dermal, respiratory and eye irritant.
	Other less effective, organic options are hydrogen peroxide, kelp sprays and the biological fungicide Serenade (Bacillus subtilis, QST 713 strain).
Conventional options	There are several fungicides that would be a good fit in a control program for potentially fungicide-resistant situations. Protectants (Captan 50WP, Wettable Sulfur 90WP) are a good option in low-pressure situations. Materials from this group must be applied prior to an expected wetting event. Protectants are not prone to resistance development following repeated applications.
	Sterol inhibitors (Elite 45 DF, Indar 75WSP, Orbit 3.6EC) provide excellent control of fruit brown rot and, as an added bonus, will control other diseases



as well. Elite and Indar are registered for use on cherries, peaches and nectarines. Orbit has plums and prunes on the label in addition to cherries, peaches and nectarines. Though it is best to apply these materials before the onset of infection, some of them (Indar, Orbit) have limited back action of 24 to 36 hours. Homeowners may find smaller packages of Immunox with the sterol-inhibitor fungicide myclobutanil as an active ingredient.

Strobilurins (Gem, Pristine) and SDHI (Fontelis, Luna Sensation, Merivon) fungicides provide two additional options for brown rot. They also must be applied prior to a wetting event since there is no available data regarding their kick-back action.

Sterol inhibitors, strobilurins and SDHI fungicides should be used in rotation to reduce the chance for fungicide resistance development by the brown rot organism.

## For more information

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Date created: October 2018

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