

Brown Rot *Monilinia spp*



Monilinia fructicola is the common cause of brown rot disease seen in several stone fruit (cherry, apricot, peach, nectarine, plum). Crop loss from this disease can occur pre-harvest, but it is also a major cause of fruit spoilage in transit or at market. As an airborne and widespread pathogen, once it is present in the orchard continual management is essential.

Understanding the Disease

Brown rot life cycle

The disease overwinters in twig cankers or rotten fruit (mummies) in the tree or on the orchard floor. In spring, conidial spores (primary inoculum) are formed from the mummies. The spores travel by wind, rain and insect movement to susceptible plant tissue such as blossoms, where they may infect. The infection can cause blossom blight or lead to infection of the growing fruit. In most cases the infection remains dormant until closer to harvest time as fruit sugar content increases. Associated with development of rot symptoms, is the production of more spores (secondary inoculum). These spores may infect other developing fruit during the season, particularly where insect wounds or cracks are present. Infected fruit left on the tree will become mummified and produce inoculum for next season.



Conditions for Infection

For infections to occur there must be inoculum present. Between 1 and 10 mummified fruit per tree poses a medium disease risk for the crop if weather conditions are right for fungal development. Green (immature) fruit contain natural disease inhibitors. As fruit ripens the inhibitors disappear and fungal infections can develop. Fruit that are shed early by the tree can express symptoms, as senescence also degrades the natural inhibitors. This can cause infection to spread early in the season. Wet conditions are essential for the germination of brown rot spores and at 16-21°C it only takes 3-4 hours for spores to germinate. These are high risk conditions.



Managing the Disease

Know your enemy

1. Identify the fungi causing brown rot in your orchard. *Monilinia fructicola* causes a tan-brown “mould” appearance on the surface of fruit. Other rot fungi such as *Monilinia laxa* and *Botrytis cinerea* (grey mould) may also be in your orchard and look very similar. These can only be distinguished by microscopic examination. While similar management applies to all, some options will differ.



How to Limit Conditions for Infection

1. Reduce the inoculum level present. Make sure rotten and mummified fruit is not left in the trees after harvest. Mulch the orchard floor to assist breakdown of mummified fruit. Prune infected wood out of the canopy.
2. Prune trees for good airflow - aim for 70% dappled shade on the ground at noon. Sunlight in the centre of the tree will also retard fungal growth.
3. Control crop load in bunchy crops by bud thinning, blossom thinning or hand-thinning. Some varieties are more prone to disease because of their bunchy fruiting behaviour. Tightly bunched fruit promote humid conditions and prevent fungicide contact.
4. Minimise fruit damage from insects and other sources of wounding, which increase the chance of secondary infection.

Chemical Options - fungicides

1. Choose chemistry that is proven on *Monilinia fructicola* and registered for your crop.
2. Use a range of fungicides for management of chemical resistance, and to comply with international maximum residue limits (MRL's) if export is planned.
3. Target the timing of fungicide application to critical infection times. Primary infections occur between blossom and fruit drop. Secondary infections develop when fruit ripens.
4. Use protectant fungicides when high risk infection conditions are forecast and use curative fungicides following high risk periods.

Organic options

1. Biological controls such as Serenade are available. Application need to be well managed for survival of the beneficial organisms and successful results.
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