Non-Botrytis Bunch Rot
Questions and answers
21 December 2010
Identifying the disease

Bunch rots on grapevines can be caused by a range of fungi, yeasts and some bacteria, including acetic acid species. The following relates to rots not caused by *Botrytis cinerea*. For information on botrytis, see the GWRDC’s Botrytis: Questions and answers.

**Q1: What types of non-botrytis rots are there?**

Non-botrytis rots can be caused by a range of fungi, yeasts and some bacteria. Those that infect berries directly are called primary invaders, while secondary invaders enter the berry through wounds or following infection by a primary invader.

A number of rots occur in warm humid areas like the Hunter Valley and they are called ‘sub-tropical fruit rots’.

**Q2: What are the common primary invaders and what do they look like?**

*Alternaria rot*

The fungus is tan, becoming brown with age. Fluffy gray tufts of fungus develop through cracks in the skin of a berry. Infection can occur through the skin in wet bunches or under very high humidity.

*Cladosporium rot*

The fungus causes a black, soft, circular area to develop on the berry. Under high humidity, the conidiophores (that produce spores) and conidia (the spores) of the fungus look velvet-like and are olive green in colour. It is typically a post-harvest disease found on late-harvest fruit after rain.

**Q3: What are the common secondary invaders and what do they look like?**

*Aspergillus rot or black mould*

This fungus is common in warm to hot areas. Damaged berries first show tan to brown fungus that develops a dusty mass of brown or black spores. The rot is soft at first, becoming firm and leathery. *Aspergillus* is frequently associated with sour rot.

*Penicillium rot or blue mould*

*Penicillium* rot or blue mould is easily identified as this fungus produces a mass of dusty blue-green spores. The rot often occurs in berries that have split following rain events or other events that lead to skin damage. *Penicillium* rot can occur following severe botrytis bunch rot but can occur concurrently with any of the other bunch rotting organisms. The distinctive colour of this rot means it is one of the easiest bunch rots to identify.
**Rhizopus rot**
Berries develop a soft brown rot that drips juice. High humidity causes cobweb-like black mycelia (the vegetative part of a fungus) to develop. Dark sporangia (the structure that produces and contains the spores) appear in skin cracks or wounds in the berry skin. The fungus can spread to other berries in the cluster. Along with *Aspergillus*, *Rhizopus* is often associated with sour rot.

**Sour rot**
Various fungi, yeasts, acetic acid bacteria and vinegar fly larvae, combined with other organisms, can cause sour rot. Juice from infected berries smells like vinegar. The rot can spread in the cluster.

**Q4: What are the common subtropical fruit rots and what do they look like?**

**Ripe rot or Colletotrichum rot**
Berries develop round, reddish skin spots. These grow over the whole berry, which becomes covered with salmon-coloured conidia (spores). The berries then shrivel and can drop. In subtropical environments, ripe rot frequently occurs late in the season following an earlier bitter rot infection (see below).

Unlike many of the other non-botrytis bunch rots, ripe rot seems to occur more frequently in open canopies, particularly in association with sunburn.

**Bitter rot or Greeneria rot**
Bitter rot is frequently seen as a series of concentric rings of black sporulation around the circumference of the berry. White grapes develop a brownish colour, black grapes have a rough appearance. Berries shrivel and can drop or remain attached to the bunch.
Q6: What conditions favour the development of these diseases?

Like botrytis, other berry rots are favoured by wet weather and high relative humidity during the growing season. Higher rainfall increases the risk and amount of these diseases. A sequence of favourable seasons can increase the incidence and severity of these diseases. Some grapevine varieties are more likely to be affected than others, particularly if they have dense clusters and vigorous canopies. Any damage to the berry skin (e.g. insect damage, hail, berry splitting after rainfall) will lead to a greater incidence of all bunch rots, including *Botrytis cinerea*.
Managing the diseases

Q7: How can I predict which rot I will have this season?
It is difficult to predict which organism will predominate in a given season. In a season that is exceptionally wet, the inoculum pressure in the vineyard will be high. Under these circumstances the likely success of any bunch rot management practices is difficult to predict. Management of non-botrytis bunch rots, and in particular ripe rot and bitter rot, continues to be a challenge in wet warm seasons.

Q8: What differences will regional climates have on the rots observed?
The bunch rot pathogen profile varies from season to season, largely due to climatic influences but also in response to management practices. Regional climate will also influence the types of fruit rots found. The Riverina, for example, is renowned for Noble rot or botrytis. As mentioned above, the sub tropical rots (bitter rot and ripe rot) are generally not found in cooler regions.

Environmental factors that might influence non-botrytis bunch rot development include water availability, heat and light. The infection of a given grape berry might also be influenced by biological factors, such as the microflora living on the berry. Two or more bunch rot pathogens frequently occur together on a bunch and even a single berry.

Q9: Can pruning practices reduce some non-botrytis rots?
As a general rule, the more old diseased wood and debris that is retained in the canopy, the higher the risk of diseases such as ripe rot, bitter rot and sour rot.

Poor surface drainage in the vineyard can create hot spots for fruit rot due to high humidity. Photo: Chris Haywood.
Q10: What viticultural practices will help reduce non-botrytis rots?

Most of the fungicides registered for botrytis control are ineffective against both ripe rot and bitter rot. Also, recent research suggests that open canopies (used for botrytis management) combined with heat stress may predispose fruit to a greater incidence of ripe rot.

Viticultural practices that may help include:

- improving air circulation and light penetration through weed control and de-suckering
- well-spaced shoot positioning or removing shoots for uniform leaf development, and
- choosing your row direction to taking advantage of the prevailing wind.

Good air circulation and light penetration will dry the canopy faster and reduce disease incidence.

Q11: What is the impact on wine quality of non-botrytis rots?

Generally, all the fungi associated with grape bunch rots lead to mouldy, musty off flavours in finished wine, although the specific effects of individual organisms are not yet understood. It is likely that many of the fungi involved with bunch rots produce the oxidative enzyme laccase, which destroys red pigmentation and can cause oxidative spoilage of wine.