viti-notes

[pests and diseases]

Research to Practice

Botryosphaeria canker and bunch rot

Viti-note Summary:

- Disease cycle and infection
- Symptoms
  - Wood and canes
  - Bunches
- Co-occurrence with other rots
- Monitoring and management options

This disease is caused by species of fungi within the family *Botryosphaeriaceae*. These fungi are commonly associated with diseases of woody plants and fruit rots.

Species of *Botryosphaeria* are found in most grape growing regions of Australia. The fungi are known to infect a wide range of hosts including native *Acacia, Eucalyptus* trees and shrubs, and members of the protea family.

Common names for the condition include Macrophoma bunch rot, Black dead arm, Botryosphaeria ('Bot') canker and dieback, Excoriose, Grapevine decline syndrome, Diplodia cane dieback and bunch rot.

There are no known effective treatments for the control of this disease in Australia, however control strategies are currently under investigation.

Disease cycle and infection

- The fungus over-winters as small dark 'pimple-like' structures (pycnidia) on diseased wood;
- These structures release spores following hydration, throughout the growing season;
- Spores are spread by wind and water splash;
- Infection occurs through fresh wounds in wood, e.g. pruning cuts;
- The fungus can germinate at temperatures between 15-37°C and grows between 5-37°C.

AVOID PRUNING OR OTHER DAMAGE TO WOOD DURING WARM WET WEATHER WHEN SPORES ARE BEING RELEASED

Infection by species of *Botryosphaeria* is also favoured by conditions that reduce vine vigour, including drought, frost, hail, high summer temperatures, poor nutrition and poor pruning practices.

Varieties producing tight bunches with thin skins are the most prone to infection by a range of bunch rotting agents, including species of *Botryosphaeria*. Infection of buds, flowers and berries at different stages of development is currently under investigation.

Symptoms

Infection by species of *Botryosphaeria* results in fruit and wood rots (Figure 1). The specific symptoms caused by each species are currently under investigation, however in general, those listed below have been observed to be associated with infection of grapevines.

Wood and canes

- Cankers form around pruning wounds;
- Wounded cordons and trunks become infected and the infection moves towards the ground (basipetally) from the wound site;
- Cordons and trunks show a wedge of necrotic tissue when cut in cross-section (this symptom is often confused with that caused by Eutypa lata, the causal agent of Eutypa dieback);
- There can be a loss of spur positions and bud mortality;
- Pycnidia form on dormant canes;
- There are no known symptoms on leaves or green shoots.

Figure 1. Grapevine trunk disease symptoms; A) Declining vine showing short stunted shoots, dead spurs and cordons, B) extensive canker in the trunk of a mature grapevine, C) wedge shaped lesion in cross section of the trunk of a diseased grapevine.

Bunches

Symptoms can be seen on young vines, but the impact of the disease is often more serious as vines mature:

- 1-4mm flat lesions with pycnidia forming on berries (especially exposed berries);
- Infected berries of white grape varieties turn light brown (colour change is less noticeable in red varieties);
- Berries blacken and shrivel, and become sticky with black spores on the surface;
- Infected berries can drop from the vine.

Co-occurrence with other rots

Species of *Botryosphaeria* are often isolated along with other fungi from discoloured wood associated with dieback symptoms. This co-occurrence can confuse identification further as many of the symptoms of Botryosphaeria canker are similar to those of Eutypa dieback and other diseases associated with pathogens causing wood discolouration.

It can be very difficult to determine the role of all these different fungi. In many cases it is suspected that species *of Botryosphaeria* are secondary invaders of wood damaged by other more aggressive organisms. In these cases they may hasten the decline by invading and killing wood that has merely been weakened by the primary agent. However, in some cases it is probable that *Botryosphaeria* is the primary disease-causing organism.

It is often difficult to differentiate symptoms caused by species of *Botryosphaeria*, both in the wood and on bunches, from those caused by *Diaporthe, Phomopsis, Eutypa, Colletotrichum* and *Greeneria* (Table 1).

Table 1 Important differences between symptoms of Botryosphaeria infection and disease caused by other fungi with similar symptoms

Fungus	Symptoms			
	Leaves	Shoots	Bunches	Other
Botryosphaeria	N	N	Y	Wood necrosis occurs
Diaporthe	N	N	N	No reported detrimental impacts on grapevines
Phomopsis	Y	Y	Bunch rot rare	Bunch rot occurs in warmer/wetter regions such as the Hastings Valley
Eutypa	Y	Y	Berries might shrivel but no rot occurs	Wood necrosis occurs
Colletotrichum	N	N	Mature pycnidia exude orange/salmon coloured masses of spores on berries just before harvest and after rain	Only occurs in warmer regions such as the Hunter Valley
Greeneria	N	N	Pycnidia produce concentric rings on berries	Can be isolated from dormant wood but no evidence that its presence has any detrimental effect

Monitoring and management options

Diagnosis

Diagnosis in the vineyard is difficult and unlikely unless pycnidia can be found, but even this might not result in certainty as pycnidia might be caused by a number of different fungi. Accurate laboratory diagnosis from samples of infected wood is possible to species level.

Management

Management strategies should be similar to those employed for grapevines debilitated by Eutypa dieback:

- Remove and burn infected wood and protect fresh pruning wounds;
- Avoid pruning/wood damage in warm wet weather;
- Encourage open bunches.

Where vine decline has progressed, it is possible to retrain water shoots from below the infected area to replace the old vine or cordons (Figure 2). Protecting large wounds, caused by pruning or machinery damage, with plastic paint or one of the materials registered for pruning wound protection makes good sense regardless of which organism is involved.

Figure 2. These vines were previously infected with Botryosphaeria canker. Management involved removing all infected tissue and (A) retraining a water shoot as a new cordon to rejuvenate the vine and (B) positioning canes to form new cordons

THERE ARE NO CHEMICALS CURRENTLY REGISTERED FOR THE CONTROL OF BOTRYOSPHAERIA CANKER AND BUNCH ROT IN AUSTRALIA

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Further information

Training

For regional specific training in pest and disease control, the AWRI is running Research to Practice: Integrated Pest Management for changing viticultural environments.

Contact

Marcel Essling: rtp@awri.com.au for more information.

Agrochemical information:

Agrochemicals registered for use in Australian Viticulture - updated annually.

Visit www.awri.com.au for the latest version.

Useful references:

Nicholas, P., Magarey, P.A. and Wachtel, M. (Eds.) 1994 Diseases and pests, Grape Production Series 1, Hyde Park Press, Adelaide (a glove box edition of this book is also available).

For images of grapevine symptoms visit www.winetitles.com/diagnosis/index.asp

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