



Phomopsis cane and leaf spot

Phomopsis viticola is a fungus that infects grapes grown in most regions of Australia, although it may be sporadic in occurrence.

Casual organism

In the past, two types of *Phomopsis* were closely associated with the disease. These were known as *Phomopsis* type 1 and *Phomopsis* type 2. Recent research, however, has determined that only *Phomopsis* type 2 causes the disease on grapevines, whereas type 1 is not damaging to the vine. To avoid confusion between the two types, *Phomopsis* type 1 is now known by the taxonomical term, *Diaporthe*. *Phomopsis* type 2 retains the species name *Phomopsis viticola* and causes *Phomopsis* cane and leaf spot, which is responsible for economic loss.

Both fungi over winter in the buds, bark, mummified bunches and canes of infected vines, and spores are spread by splash-dispersal during wet spring weather. It is known that they can remain dormant in infected canes, spurs and dead wood for a number of years. Although both cause bleaching of canes, *Diaporthe* does not cause leaf, shoot, inflorescence or bunch symptoms, or any economic losses. Crop loss caused by *Phomopsis* is generally through girdling of shoots, and weakening and cracking of canes which consequently lowers productivity of vines. Berry rot can occur but is rare in Australia.

DIAPORTHE DOES NOT CAUSE SYMPTOMS ON LEAVES AND SHOOTS AND CROP LOSS, THEREFORE DOES NOT REQUIRE CHEMICAL SPRAYING.

To avoid wasting time and resources trying to 'control' a harmless *Diaporthe* infection, it is important to accurately diagnose which of these two fungi, if any, is present using the symptoms described below. Because chemical control is unnecessary for *Diaporthe*, the following comments refer to *Phomopsis* except where necessary to distinguish between the two fungi.

Spore dispersal and favourable environmental conditions

In spring when temperatures are between 1-30°C (optimum 23°C), the resting structures of the fungus release threads of jelly-like spore masses if wetted for at least 10 hours. Spores are spread by water and rain-splash on to young newly-developed shoots, therefore infections are generally localized in the vineyard. Spores infect vines via leaves or stems if conditions remain wet for a further 8 or more hours. The risk of *Phomopsis* infection is low if there are few extended rainfall periods in spring.

COOL WET WEATHER IN SPRING FAVOURS PHOMOPSIS DEVELOPMENT

Symptoms

Symptoms in winter are generally seen as black cracks, and bleached white areas on dormant canes speckled with small black spots. Cane bleaching is not a reliable indicator of *Phomopsis* infection however, as bleaching can also be caused by a range of factors such as weather extremes and other types of fungi. Leaf and shoot symptoms can be seen in spring.

CHECKLISTS OF SYMPTOMS

	PHOMOPSIS	DIAPORTHE
LEAVES	<p>Leaf symptoms first appear in spring on the lower leaves of shoots.</p> <ul style="list-style-type: none"> • Small dark brown spots, usually less than 1mm, with 2-3mm of yellowish halo surrounding the brown spot • Leaves can distort, and be partially killed or stunted • Spots can become necrotic, darken and drop out. • Leaves with badly affected stems can turn yellow and fall. 	NONE
GREEN SHOOTS	<ul style="list-style-type: none"> • Small spots with black centres develop, usually on the lower internodes, gradually expanding and elongating to form black crack-like lesions up to 5-6mm long • Large numbers of merging spots on badly infected shoots may give a 'scabby' or 'corky' appearance • As canes grow and harden, the fissures crack and scar • Girdled shoots can fail to mature, or become stunted and die • Severe infections can lead to dwarfing, deformation and death of infected shoots which break off near the base • Weakened older shoots (30-60cm long) can break in strong winds, usually where lesions are numerous. 	NONE
INFLORESCENCES AND BUNCHES	<p>Phomopsis can cause black speckled rotting of berries, but this is rare in Australia and does not occur without prior leaf and shoot symptoms:</p> <ul style="list-style-type: none"> • Flower cluster rachis develops spots like those found on leaves • Severely infected clusters wither • If rain occurs just before harvest, previously uninfected berries can develop light brown spots which enlarge, blacken and exude yellowish spore masses • These berries shrivel and become mummified. 	NONE
CANES	<ul style="list-style-type: none"> • Infected canes may be bleached white in winter • Bleached areas, particularly those around the nodes, become speckled with small black spots (the resting structures of the fungus) • These spots are prominent in the cortex of infected one year old canes, on spurs, bunch and berry stems, and tendrils. 	<ul style="list-style-type: none"> • As for Phomopsis, in some cases thin black lines outlining the bleached areas may be visible.

Monitoring for symptoms

Begin monitoring by looking for signs of old infections around 4 weeks before budburst.

A simple test can show if bleached canes are a result of fungal infection, but cannot be used to distinguish between Phomopsis and Diaporthe. After following the test below and fungi is observed, monitoring of newly developed shoots and leaves should be carried out.

- Take cuttings from suspect 1 year old canes and spurs (especially around lower internodes and nodes) around 4 weeks before budburst. Lay the cuttings flat on a moist paper towel or sponge in a small sealed plastic container (eg. lunchbox) and keep at room temperature (20°C-23°C), in the dark for 10 days or more.
- After this time look to see if the black spots on the canes have produced pimple-like yellow or cream-coloured spore masses. You should be able to see them with a X10 hand lens. If you have a compound microscope, spores should be visible in these masses under X400 magnification.
- If spores have been produced, check your monitoring records from the last several seasons to see if leaf spots and shoot lesions were observed in the vineyard during the growing season, particularly in the areas adjacent to where you took your sample cuttings.

If no Phomopsis-like symptoms were observed on leaves and green shoots in previous seasons, it is unlikely the fungus you have found on your cuttings is the disease-causing Phomopsis, but another which does not impact on vines. If you want to be certain, resample the vines and forward to a laboratory for diagnosis.

DURING WINTER, TEST FOR FUNGI ON BLEACHED DORMANT CANES

In spring, about 3 weeks after suitable conditions for infection, leaves develop small brown spots approximately 1mm in diameter with a yellow halo. Diseased leaves can become distorted or stunted and the centres of the spots may die and drop out.

Shoot symptoms can take around 4 weeks to develop. Black lesions form on lower internodes. These may eventually crack, causing the shoots to become girdled and break.

IF WET CONDITIONS OCCUR IN SPRING, MONITOR VINES EVERY 1-2 WEEKS FROM 3-4 WEEKS AFTER BUDBURST FOR LEAF AND SHOOT SYMPTOMS

Where to monitor

The most likely places for Phomopsis to occur in a vineyard include blocks or rows where it has previously been a problem (there are likely to be resting spores of the fungus in buds, bark, mummified bunches and canes). These vines and the area around them should be monitored for several years after the last recorded infection. Phomopsis is also encouraged by damp and humid sites, such as where overhead irrigation sprinklers overlap, in sheltered areas where air movement may be low such as adjacent to wind breaks or sheds, or in hollows, and inside dense canopies.

FOCUS MONITORING IN PREVIOUSLY DISEASED AREAS AND DAMP SHELTERED SITES

A number of winegrape varieties are susceptible to Phomopsis including Grenache, Palomino, Muscadelle, Sultana (Thompson Seedless), Waltham Cross, Red Globe, Purple Cornichon, Muscat Hamburg, Ohanez, Cardinal, Tokay, White Malaga, Emperor, Calmeria, Rish Baba, Kandahar, Olivette Blanche, Olivette Noir, Shiraz, Pinot Noir, Chardonnay, Cabernet Sauvignon, Riesling.

TAKE SPECIAL CARE IN MONITORING SUSCEPTIBLE VARIETIES

Management

If diagnosis determines that the disease is not present in the vineyard, treatment is not necessary. However if Phomopsis has previously been a problem, or diagnosis of dormant canes confirms it has been introduced into the vineyard, appropriate registered fungicides must be applied before the fungus produces spores and has the chance to infect new growth. Chemicals available do not eradicate the disease once new shoots and leaves have been infected - it can only act to prevent infection.

RELY ON PRE-SEASON DIAGNOSIS FOR MANAGEMENT OF PHOMOPSIS WAITING FOR LEAF AND SHOOT SYMPTOMS OF THE DISEASE TO APPEAR IS NOT RECOMMENDED AVAILABLE CHEMICALS MUST BE APPLIED PRE-INFECTION

With careful monitoring for Phomopsis presence and weather conditions favourable for disease development, well timed protectant sprays can be applied to provide management of this disease. Monitor for symptoms on newly-developed leaves and shoots after spraying to see whether treatment was effective.

Further information

Product or service information is provided to inform the viticulture industry about available resources, and should not be interpreted as an endorsement.

A useful reference with illustrations of the lifecycle and symptoms is

- Diseases & Pests, editors, Nicholas, P., Magarey, P.A. and Wachtel, M., 1994, Grape Production Series 1, Hyde Park Press, Adelaide, (available Winetitles, 08 8223 4700, or www.winetitles.com.au).

- See also the glove box edition of the above, Field Guide to Diseases and Pests.

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- Enquiries to Peter Mansfield at Winetac on (08) 8373 7090 or visit www.crcv.com.au for more information.

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