



Eutypa dieback

Viti-note Summary:

- Damage and loss
- Conditions favouring spore production
- Life cycle and disease development
- Susceptibility
- Other host species
- Symptoms and monitoring
- Monitor for shoots symptoms in early spring
- Where to monitor
- Differences between cane and spur pruned vines
- Control using pruning wound protectants
- Management using pruning and topworking techniques



Figure 1. Classic *Eutypa* symptoms of stunted growth and decline along the cane (photo courtesy of Adrian Loschiavo)

Eutypa dieback is a disease caused by a fungus (*Eutypa lata*) which grows slowly through the wood of infected grapevines and other woody host plants. Vines become infected through fresh wounds such as those made during pruning. Toxins produced by the actively growing fungus cause stunting of the shoot, though the severity of stunting varies between years and varieties. Two or more years might pass between infection and the appearance of symptoms. It is unlikely that the disease can be spread through cuttings as it appears the fungus itself is isolated to woody parts of the vine.

BY THE TIME SYMPTOMS APPEAR THE FUNGUS IS WELL ESTABLISHED WITHIN A VINE

Damage and loss

The fungus eventually kills infected parts of vines and can potentially kill the whole vine. While infected vines continue to

produce fruit, yields gradually decline and the symptom of uneven ripening can reduce wine quality.

Conditions favouring spore production

Eutypa dieback is unlikely to occur where rainfall is less than 250 mm per year and is most common where rainfall exceeds 500-600 mm per year. This also applies to vineyards which receive the equivalent in overhead irrigation. The fungus reproduces in areas where 350-500 mm or more of precipitation occurs annually. Spores are spread by wind, potentially travelling 100 km or more and are present in most districts during wet conditions.

SPORES CAN BE SPREAD OVER VERY LONG DISTANCES; LOCAL VINES NEED NOT BE THE SOURCE

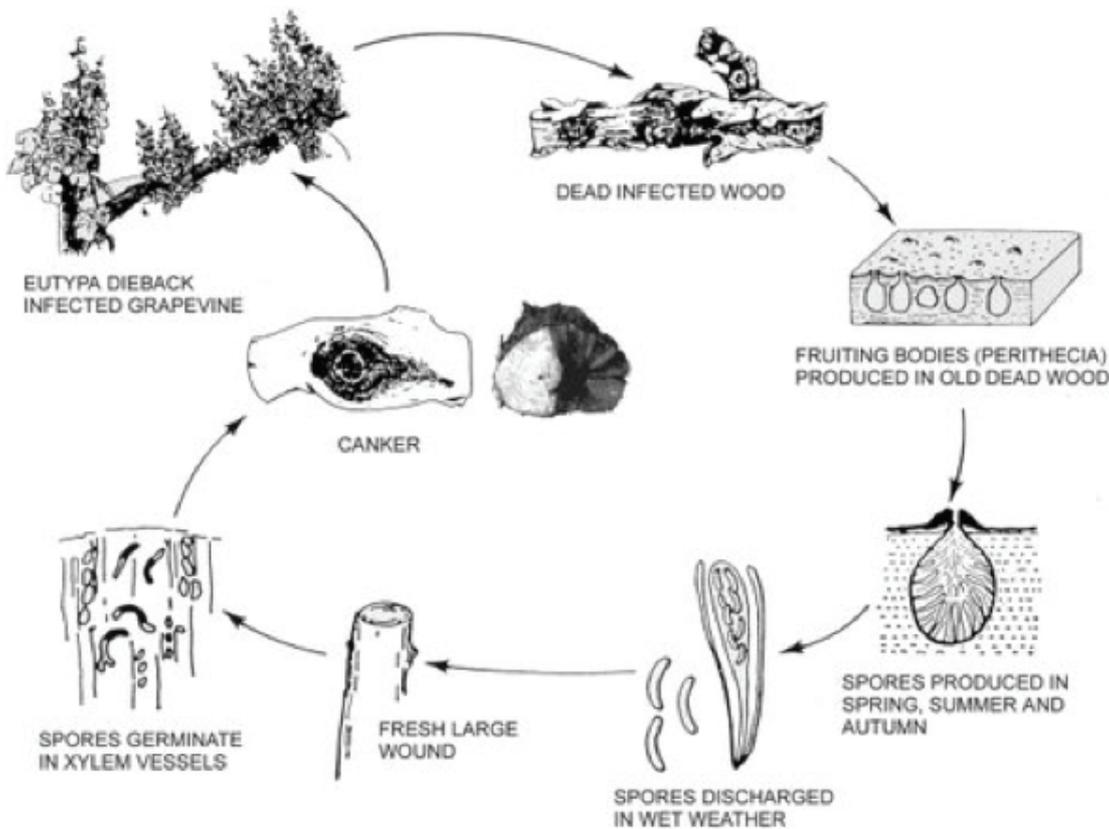


Figure 2. Eutypa life cycle (diagram courtesy of Adrian Loschiavo)

Life cycle and disease development

Where vines or other woody plants have been infected for around 8-10 years, each subsequent winter, masses of 'pimple-like' fruiting bodies are produced on a blackened area of dead wood known as the stroma. Stroma can break off infected trees and vines and remain active on the ground under diseased plants. Spores are released each time the stroma is wetted for 1-2 hours or longer by as little as 2 mm of rain or overhead irrigation. Spore production can continue for up to 36 hours if the stroma remains wet. New spores mature in around 12 days.



Figure 3. Stroma (photo courtesy of Adrian Loschiavo)

SPORE PRODUCTION AND DISPERSAL DEPENDENTS ON THE DEVELOPMENT OF FRUITING BODIES AND THE LEVEL AND FREQUENCY OF RAINFALL OR OVERHEAD IRRIGATION

Spores may be released throughout the year if suitable conditions occur, but vines can only become newly infected during wet weather when spores are splashed or blown onto wounds that have recently been made. The spores are sucked into the damaged water conducting vessels exposed at the surface of an open wound and can germinate at temperatures between 2 and 25°C. Leaf and shoot symptoms only appear several years later above an infection point.

INFECTION OCCURS IN SUITABLE WET CONDITIONS BUT ONLY WHEN FRESH WOUNDS ARE PRESENT

Three to four years following infection, cankers are obvious around old infection sites, such as pruning scars. Eventually these cankers develop a flattened appearance with no bark. If an infected cordon or trunk is cut in cross-section, a wedge of dead tissue can be seen and can usually be traced back to the canker. Cankers continue to grow around the cordon or trunk of an infected vine, with the wedge of dead tissue increasing over time until the vine is killed.



Figure 4. Canker and typical wedge shaped symptom in trunk cross-section (photo courtesy of Adrian Loschiavo)

CANKERS EVENTUALLY FORM AROUND OLD INFECTED WOUNDS

Susceptibility

All grapevine cultivars are susceptible to eutypa dieback, however, some vary in the severity of the foliar symptoms. Grenache and Shiraz are considered susceptible as the symptoms are more obvious than in some other cultivars such as Riesling, Semillon and Merlot. Chardonnay has high levels of the chemicals that assist in wound healing, and this may play a part in its greater tolerance. Despite different tolerance levels, eutypa dieback is commonly seen in Cabernet Sauvignon, Shiraz, Sauvignon Blanc, Gewurtztraminer, Muscadelle/White Tokay, Chenin Blanc, Palomino, Mataro and Colombard.

CAREFULLY MONITOR SUSCEPTIBLE VARIETIES: USE THESE AS INDICATORS OF DISEASE ACTIVITY

Other host species

The fungus infects a wide range of hosts, most of which are trees. These include commercial crop trees, common garden and farm ornamentals, hedge species or woody weed plants. Examples include but are not limited to almond, apple, apricot, black currant, *Ceanothus*, cherry, cork oak, fig, hawthorn, ivy, lemon, *Oleander*, pear,

peppercorn tree, persimmon, pistachio, plum, poplar, quince, rose, sweet cherry, sweet *Pittosporum*, tamarisk, walnut and willow. In some areas, host plants may lay adjacent to vineyards. There has been no recorded incidence of eutypa dieback in any of the native trees or shrubs (except sweet *Pittosporum*), nor on members of the *protea* family, grasses or conifers.

OTHER WOODY PLANTS MAY BE THE SOURCE OF SPORES OF EUTYPA DIEBACK IN A REGION

Symptoms and monitoring

Affected shoots can be stunted to less than a quarter the length of unaffected ones. These shoots are characterised by shortened internodes and small pale yellow/green leaves, which are often cupped and tattered around the margins. Other affected leaves can be speckled with dead areas that might increase in size over time until older leaves develop a 'scorched' appearance. These symptoms will often only appear on one cordon of an infected vine.

When normal shoots reach 10-20 cm in spring, inspect vines for stunted shoots and leaf symptoms. These will show up clearly against normal healthy growth. Later in the season, affected shoots can be hidden from view by the growth of healthy shoots on the same vine. Shoots showing mild symptoms of the disease will be particularly difficult to spot later in the season. Flower clusters and young bunches might appear to develop normally on infected shoots but these will eventually die and shrivel.

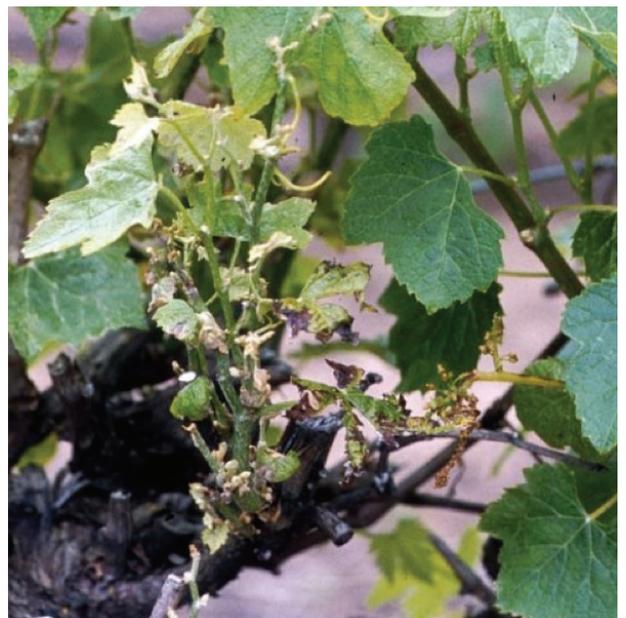


Figure 5. Typical stunted shoot symptoms of *Eutypa* (photo courtesy of Adrian Loschiavo)

Monitor for shoots symptoms in early spring

If stroma is found in a vineyard, shoot symptoms should already have been visible for many seasons. If leaf and shoot symptoms have been observed, inspect vines during winter, especially wood older than five-years for signs of canker development near pruning scars. Symptomatic wood can be sent to a diagnostic laboratory for positive identification of the fungus. Even in seasons where symptoms are mild, if eutypa dieback infection has been confirmed in vines, the fungus remains active and continues to grow.

Tag and observe suspected vines. If yellowing of leaves has been noted, and subsequent failure of buds occurs, the suspected cordons should be marked with flagging tape and the nature of the symptoms recorded. Subsequent development of secondary shoots, particularly crown suckers, followed by scorched leaves later in the season should be noted (these symptoms may not all occur in the one growing season). If the disease is present, progression to more obvious symptoms can be expected after several seasons.

EUTYPA DIEBACK MONITORING IS A LONG TERM ACTIVITY

Where to monitor

Look for leaf and shoot symptoms on susceptible cultivars, top worked vines or those with large pruning wounds. Older or stressed vines due to shallow or waterlogged soils are also more likely to show symptoms. Monitoring should be more extensive in these and other areas where vegetation is known to be infected by eutypa dieback. It might be useful to use Grenache, Cabernet Sauvignon or other susceptible cultivars as indicators of disease activity, as the disease is most likely to be expressed in these cultivars before more tolerant ones.

Differences between cane and spur pruned vines

In head-trained cane-pruned vines, the basal and distal buds open first, and these become the shoots which tend to exhibit stunting. With spur pruning the disease is more likely to be observed in a cordon. The number of stunted shoots on an infected cordon increases over time until the affected part can no longer produce shoots, and dies. Typically, infected vines will contain dead sections along one or both cordons and it is not unusual for one cordon of an infected vine to die before the other.

Control using pruning wound protectants

Wounds larger than a twenty-cent coin should be protected immediately after pruning and if practical, smaller sized wounds should also be protected. The bio-control agent Vinevax® is registered for this purpose and controls eutypa dieback if used strictly as recommended. Greenseal® (paint + tebuconazole) is also registered for control of Eutypa dieback. Carbendazim based fungicides, such as Bavistin®, when painted or sprayed onto wounds in SARDI trials were found to reduce infection. Acrylic paints, either alone or applied after carbendazim application, also protected against infection in experimental trials. Neither carbendazim nor acrylic paints are registered for this purpose in grapevines.

Management using pruning and topworking techniques

Pruning wounds can remain susceptible for 2-4 weeks, so an estimate of likely weather conditions in the month following pruning can indicate the risk factor for infection by eutypa dieback. Transmission of the fungus by pruning tools present a low risk but efforts should be made to clean tools between blocks and vineyards. Avoiding horizontal cuts in favour of angled cuts may reduce the chance of infection.

Depending on the severity and location of the infection, only some reworking techniques are effective in prolonging the economic life of a vine:

- If it is feasible, saw off the diseased arm of the vine until no discolouration is seen in the cross section, and then saw off a further 5 cm below that. Thoroughly soak the wound immediately with a registered fungicide using a paint brush or spray bottle;
- If the trunk is infected, it may be possible to rework the vine just below soil level to avoid re-infection of the worked vine by the airborne spores of the fungus which causes eutypa dieback.

THERE IS NO CURE FOR THIS DISEASE: AVOID WOUNDING VINES IN WET WEATHER, ESPECIALLY IN WINTER

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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.

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



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