FACT SHEET JULY 2010

# Eutypa dieback

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# 1. Summary

Eutypa dieback, caused by the fungus *Eutypa lata*, is a major trunk disease of grapevines. The productivity of infected grapevines gradually declines and vines eventually die. Eutypa dieback occurs worldwide in cool climate wine regions with annual rainfall exceeding 350 mm. It is widespread in premium winegrowing regions of south eastern states of Australia and New Zealand. Vines become infected through fresh wounds such as those made during pruning or reworking. The fungus grows slowly through the cordon and trunk eventually discolouring and killing wood. Toxins produced by the fungus cause stunted shoots. The disease can be controlled by protecting wounds from infection by *E. lata* spores or by physically removing infected wood. Wounds can be protected with fungicides, paints, pastes and biological control agents but pruning should be timed to avoid rainfall events and dead wood removed from the vineyard to reduce inoculum. Established infection can only be controlled by removing infected wood and retraining watershoots from below infection.

# 2. Symptoms

### 2.1 Foliage

Eutypa dieback is most obvious in spring when shoots are 30-70 cm long (Fig 1). Shoots appear stunted and leaves yellow, often cupped and with dead margins (Fig 2). Foliar symptoms usually develop within 3-8 years of infection but the severity of symptoms may vary between years.

Figure1. Stunted shoots caused by eutypa dieback
Figure 2. Stunted shoot showing cupped leaves with dead margins

### 2.2 Fruit

Bunches on stunted shoots ripen unevenly, are small and in severe cases shrivel and die (Fig 3).

Figure 3. Fruit symptoms with uneven ripening and shrivelled bunches

### 2.3 Wood

Cross-sections of cordons with stunted shoots reveal dark brown wedge-shaped zones of dead wood (Fig 4). Many years after infection, cordons begin to dieback (Fig 5) and cankers (sunken dead areas) develop on the outside of cordons and trunks (Fig 6). Vines are killed when the infection girdles the trunk.

Figure 4. Wedge-shaped zone of dead wood

Figure 5. Cordon dieback 'dying arm'

Figure 6. Eutypa dieback canker (sunken areas of dead wood)

### 2.4 Crop loss

Yield are related to the severity of foliar symptoms. Losses up to 860 kg/ha have been reported in severely infected Cabernet Sauvignon and Shiraz.

### 2.5 Varietal susceptibility

All *Vitis vinifera* varieties can be infected but foliar symptoms are most pronounced in Grenache, Cabernet Sauvignon and Shiraz. The fungus grows between 10 mm/year for Merlot and up to 18 mm/year for Cabernet Sauvignon.

# 3. Biology

### 3.1 Disease cycle

Spores are released following at least 2 mm of rain or irrigation from stroma; wood which appears like charcoal and contains *E. lata* fruiting bodies (Fig 7). Spores can travel up to 50 km to infect open wounds. The fungus slowly grows in the vascular tissue within the cordons towards the base of the trunk killing wood tissue and reducing the transport of water and nutrients to foliage. Eventually die back of cordons and vine death occurs. Foliar symptoms are caused by fungal toxic metabolites produced in the wood and transported to the foliage. Stroma form 8-10 years after the wood is infected.

Figure 7. Dead, diseased wood (stroma) with charcoal appearance

### 3.2 Infection

Wounds are most susceptible immediately after cuts are made and remain susceptible for up to 4 weeks. Wounds are less susceptible in late winter and spring when wound healing is more rapid. There is more competition from naturally occurring beneficial microorganisms and sap flow may 'flush out' spores from the vascular tissue.

Spores are produced from stroma within 2 h of the onset of rain or irrigation and continue to be released for at least 36 h. Around 12 days later a new generation of spores will be produced and ready for release.

Larger wounds provide a greater surface area for spores to land, take longer to heal and are more vulnerable to infection. Older vines have more and larger wounds and provide a greater surface area for infection. Spur-pruned vines have greater wound surface area than cane-pruned vines and are more likely to be infected. However, wounds

on cane-pruned vines are near the crown so infection can rapidly move into the trunk.

### 3.3 Alternative hosts

*E. lata* can infect 88 species of plants including stone fruit, pome fruit, citrus, black currant, fig, olive, pistachio, walnut, quince, persimmon, willow, poplar, oak, hawthorn, ivy, Ceonothus, Oleander, peppercorn and rose. Dead, diseased branches of these plants may provide a source of spores to nearby vineyards. Apricot is a common host of *E. lata* and appears as apricot gummosis. *E. lata* has not been recorded on native Australian plants.

## 4. Disease management

### 4.1 Cultural practice

Pruning in wet weather should be avoided and preferably delayed to late winter when wound healing is more rapid and sap flowing.

Removal of dead wood from grapevines and alternative hosts in and around the vineyard will reduce the potential inoculum level.

The level of infection can be reduced by double pruning, the practice where mechanically pre-pruning is used to leave long spurs in early winter followed by hand-pruning to short spurs in late winter.

Contamination of pruning tools is not a major means of spreading the disease.

### 4.2 Wound protection

***Paints and pastes***

The application of acrylic paints and Greenseal paint (containing tebuconazole) are recommended as wound protectants, especially on large wounds. Other treatments such as Gelseal (tebuconazole) and Garrison (cyproconazole + iodocarb) are also effective but are not yet registered for use on grapevines.

***Fungicides***

Bavistin (carbendazim) and Folicur (tebuconazole) are the most effective fungicides tested as wound protectants but Scala (pyrimethanil), Switch (cyprodinil + fludioxonil) and Shirlan (fluazinam) were also effective when applied at rates higher than currently registered for use on other grape diseases. Carbendazim is no longer available and further evaluation of other fungicides is required for registration. Fungicides used for eutypa dieback management overseas include Topsin M (thiophanate-methyl), Mycloss (myclobutanil), Nustar (flusilazole) and Cabrio (pyraclostrobin).

Applying fungicide wound protectants with commercial spray machines has potential to improve the efficiency of eutypa dieback control on large large-scale vineyard plantings (Fig 8). Further research with fungicides to determine the optimal rates and water volumes for adequate coverage and control with different sprayers is required.

Figure 8. Application of pruning wound protectant with a fan sprayer

***Biological control***

Biological control agents, such as the fungi *Trichoderma* spp. and *Fusarium lateritium* and bacteria *Bacillus subtilis* have controlled *E. lata* in trials worldwide, but the results have been variable and control is usually less effective than fungicides, paints and pastes. Vinevax (containing *Trichoderma*) is registered for eutypa dieback control in Australia. Although biological control offers long-term protection, the 1-2 weeks required for biological control agents to colonise the wound creates a window of susceptibility to infection by *E. lata.*

### 4.3 Control

Vines showing foliar symptoms in spring should be tagged and all infected wood removed any time by remedial surgery. Discoloured cordon and trunk wood should be cut out and a further cut made at least 10 cm below to ensure all infected wood is removed. Remaining wounds must be protected as described above. Cordons and trunks can be retrained from watershoots (Fig 9).

Figure 9. Vine with stunted shoots on the left cordon emerging from high on the trunk above infected wood and healthy shoots on the right cordon emerging from the bottom of the trunk below infected wood.

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