



Grapevine trunk diseases

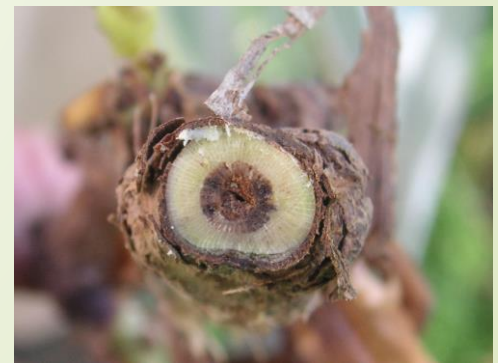


Staying healthy

Helen Waite

What are grapevine trunk diseases?

- ▶ A suite of more than 100 fungal and possibly bacterial species that can infect the xylem tissue of vines and cause disease. They are not found in leaves.
- ▶ GTDs are usually present in mixed infections of two or more different pathogens.
- ▶ Cause slow decline of mature vines over a number of years.
- ▶ Infected nursery vines cause young vine decline over 1-5 years after planting
- ▶ Symptoms are often mistaken for poor cultural practices or environmental stress.



Common GTDs

- ▶ The most common trunk diseases include
 1. **Bot cankers** (Botryosphaeriaceae spp.)
 2. **Petri disease** (*Phaeoacremonium chlamydospora* and *Phaeomoniella* spp.)
 3. **Black foot** (*Campylocarpon* spp., "*Cylindrocarpon*" spp., *Cylindrocladiella* spp. and *Ilyonectria* spp.)
 4. **Eutypa** (not transmitted in propagation)
- ▶ It is common for more than one pathogen to be present in diseased vines.
- ▶ White heart rots may also be present with Petri disease, collectively called esca in Europe





GTD epidemiology

- ▶ Vines can be infected at any age.
- ▶ GTDs enter through wounds or natural openings or by direct penetration of the bark.
- ▶ Spores are often released in rainy weather.
- ▶ To date, no scion varieties or rootstocks have been found to be resistant.
- ▶ GTDs are transmitted through propagation, rain or sprinkler splash and on the wind. Transmission on pruning shears is unlikely.
- ▶ GTDs generally have alternative hosts such as olives, fruit trees and ornamentals.



GTDs in propagation

- ▶ GTDs can be transmitted in cuttings taken from infected mother vines.
- ▶ Infected cuttings are asymptomatic until they have grown in the nursery for a season
- ▶ In the nursery, GTDs are transmitted through soaking, poor sanitation and grafting.
- ▶ If GTDs contaminate graft unions, they interfere with graft healing
- ▶ Young vines are generally asymptomatic to the untrained eye during the first year in the nursery.
- ▶ Symptoms express after planting in the vineyard causing poor strike rates and stunted and delayed growth.



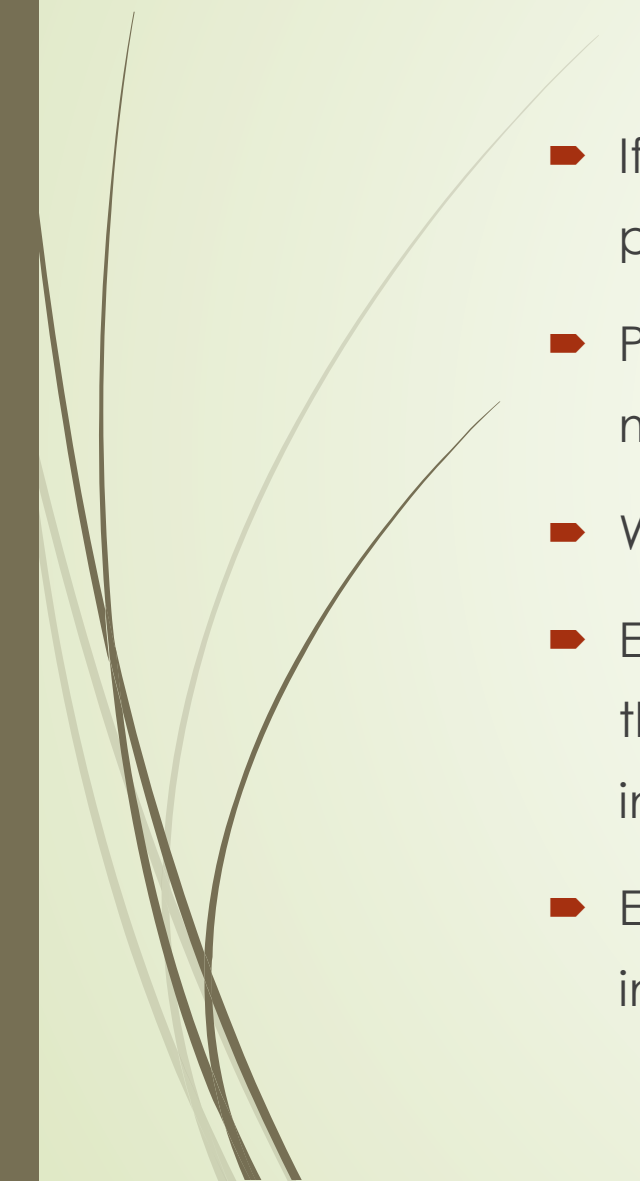
Symptoms of GTD infection acquired in the first year of growth



NB. Symptoms do not become visible until early in the second year of growth



GTDs in the vineyard

- ▶ If infected vines are planted, the vines may die within the first year after planting, or be slow to establish and never become fully productive.
 - ▶ Post-planting infections enter through pruning wounds or other wounds made by machinery or browsing animals.
 - ▶ Wounds are susceptible to infection for a minimum of 3 months.
 - ▶ Environmental stress including extreme temperatures and droughts increase the susceptibility to infection and favour the development of extant infections.
 - ▶ Excessive applications of nitrogen also increase the susceptibility of vines to infection.
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Symptoms of GTDs in the vineyard

- ▶ Symptoms of GTDs often go unnoticed in the vineyard, or are attributed to other causes including weather, poor planting practices, irregular irrigation etc.
- ▶ Indications that GTDs may be present include:
 1. Newly planted vines failing in the first 1-5 seasons
 2. Death of woody tissues in the trunks and cordons of vines which show as cankers (dead wood without bark).
 3. The “tiger stripe” leaf pattern of esca and the small cupped and curled leaves of eutypa caused by GTD toxins that are transported to the leaves from the trunk.

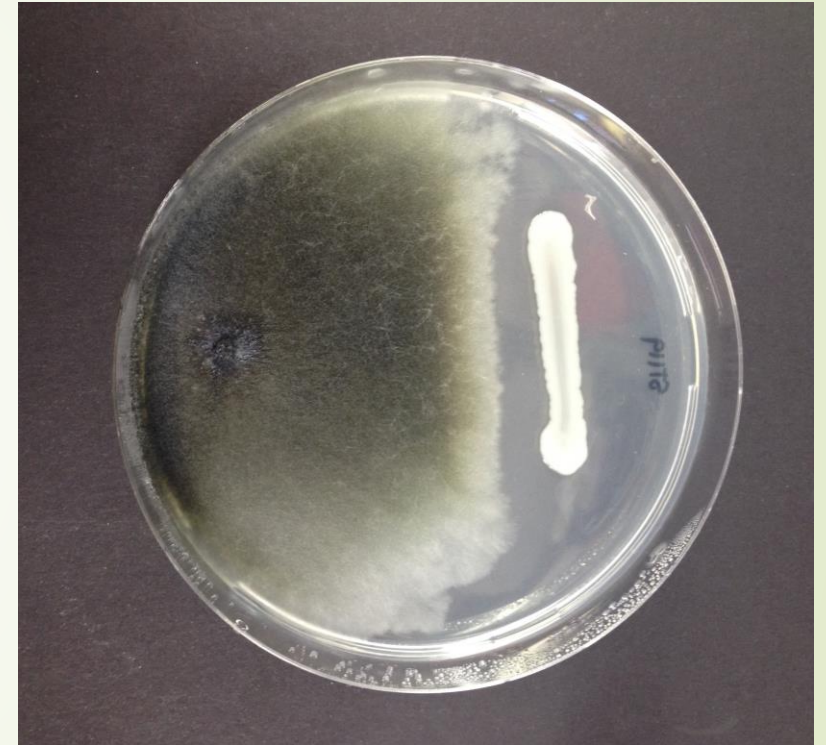
Symptoms of GTDs in the vineyard

- Brown/purple “measles” on fruit
- “Tiger stripe” pattern of chlorotic and necrotic tissue on older leaves.
- Long term slow decline of vineyards that become uneconomic by age 15.
- Delayed bud burst in spring and generally stunted growth.
- Sudden death of vines (apoplexy)



Is there a cure?

- ▶ At the moment there are **no effective cures for GTDs**.
- ▶ Once vines are infected they remain infected for life.
- ▶ Prevention and careful management are the only options.
- ▶ However, research on potential biocontrols has begun.






Managing GTDs in the vineyard

- ▶ **Start with healthy vines!**
- ▶ Avoid making big wounds by:
 - ▶ Choosing the trellis and training system and sticking to it.
 - ▶ Not top working to change varieties.
 - ▶ Painting wounds in wood more than one season old with wound protectant and spraying a fungicide immediately after pruning.
 - ▶ Not pruning in the rain.
 - ▶ Planting windbreaks of non-host species.
 - ▶ Mulching or burning prunings

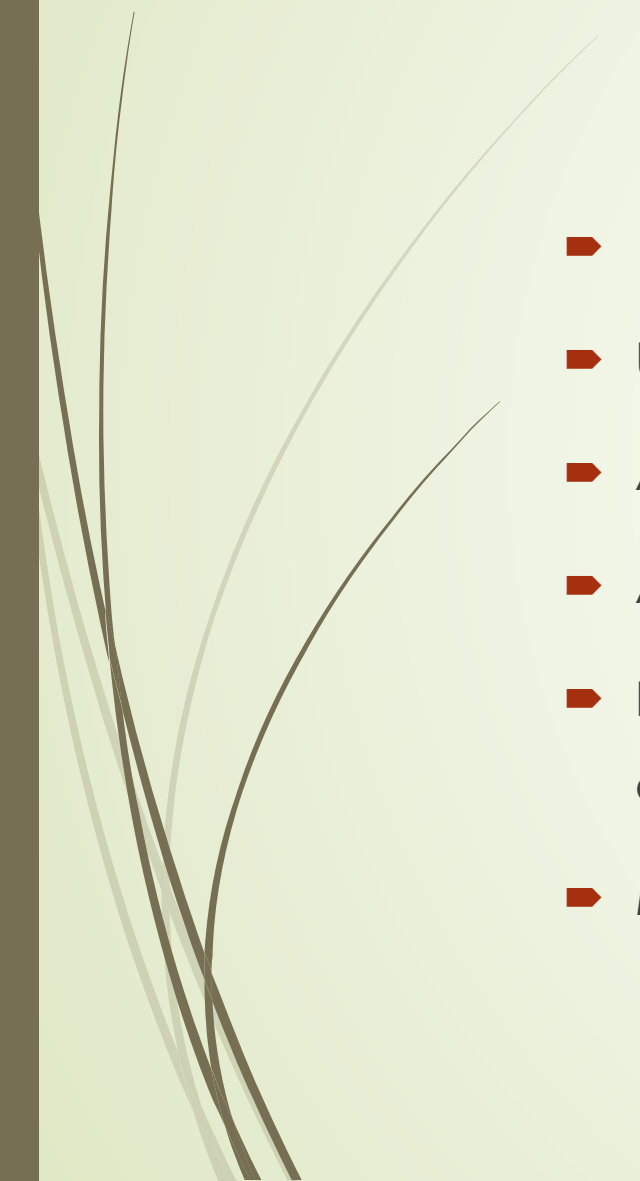


Managing GTDs in the vineyard

- ▶ Remedial surgery to remove or restructure infected vines or cordons.
 - ▶ Cut to 10cm below visible symptoms or where the cross section stains evenly with iodine.
 - ▶ Burn prunings to reduce inoculum (TDs sporulate on dead wood, particularly in wet weather).
 - ▶ Paint large wounds as soon as they are made.
 - ▶ Spray the vineyard immediately post pruning (Topsin M)
 - ▶ Consider delaying pruning or double pruning.
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Managing GTDs in the vineyard

- ▶ Apply irrigation if needed to avoid water stress
 - ▶ Use frost mitigation measures to prevent cold damage to the vines
 - ▶ Apply mulch once the danger of frost has passed
 - ▶ Avoid compacting the soil with machinery such as tractors
 - ▶ Ensure the vines have adequate nutrients, but do not use excessive amounts of nitrogenous fertilizers.
 - ▶ Manage the canopy to promote good air flow and light penetration.
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Summary



- ▶ GTDS are a suite of more than 100 fungal (and bacterial?) pathogens that infect the woody tissues of grapevines causing young vine decline and apoplexy and slow decline of mature vines.
- ▶ The symptoms of GTDs are often mistakenly attributed to other causes.
- ▶ Good vineyard management practices help to prevent and reduce GTD infections.
- ▶ Wounds are vulnerable for more than 3 months and should be protected with appropriate registered treatments.
- ▶ All pruning debris should be removed and burnt promptly.

Thank you for your attention



Any questions?