

## Crown gall disease: risk factors and management



### Risk factors for crown gall disease

Crown gall disease is endemic to Australia and affects grapevines as well as many other horticultural crops. It is caused by two bacterial genera, *Agrobacterium* and *Allorhizobium*, both members of the Rhizobiaceae family. Pathogenic and non-pathogenic strains of these bacteria are widespread in soils and water globally. Potential sources of these bacteria include soil, plant remnants and infected planting material. This fact sheet provides information about risk factors and management of crown gall. More information about crown gall disease is available in a second fact sheet 'Crown gall in Australian vineyards'.

Particular risk factors for crown gall in vineyards include:

- **Previous incidences:** Sites with increased risk are those with a history of suspected or confirmed crown gall on grapevines or other crops, and/or known soil infection.
- **Sites with high risk of vine wounding:** Planting in sites susceptible to frost, nematodes or vine damage from pest animals can increase the risk of infection due to the creation of wounds that allow crown gall bacteria to enter the vine and initiate infection.

- **Rainfall and irrigation:** Regions with high and frequent rainfall during the growing season, reliance on overhead sprinklers, or susceptibility to waterlogging can all create conditions conducive to crown gall infection.

### Guidelines for managing crown gall in the vineyard

- **Conduct a thorough inspection:** Extensively inspect all vines in your block to determine the incidence (proportion of infected vines) and severity of crown gall symptoms. Tag symptomatic vines and repeat inspections over time to monitor change. Conduct an economic analysis to identify the infection level at which removal of the whole block is warranted.
- **Remove and dispose of severely infected vines:** To mitigate the spread of crown gall from infected vines, at dormancy, remove those displaying severe infection (where vine productivity has been significantly compromised) and those that have died. Carefully uproot the vines to remove as much root material as possible and dispose by burning. Do not add diseased vines to compost or mulch piles.
- **Maintain equipment hygiene:** Implement a practice where vineyard operations always begin in clean blocks and conclude in diseased-affected blocks. When moving between disease-affected blocks and prior to restarting work in clean blocks, ensure that all equipment or machinery (e.g. cultivation tools, mechanical weeders, pruning/grafting equipment) contacting soil or vine trunks has been thoroughly cleaned of soil and plant material and sprayed or submerged (where possible) in undiluted methylated spirits to reduce the bacterial load.
- **Prune in dry weather:** Prune during dry conditions to prevent rain splash-induced infection of pruning wounds. Apply acrylic paint or a registered pruning wound dressing to large wounds.
- **Prevent wounds:** Take measures to avoid wounding roots and trunks during vineyard operations, as open wounds are sites for potential infection.
- **Consider replacement trunks:** Grapevine trunks with crown gall can be removed and replaced by training up water shoots, where present. Replacing trunks that have large galls obstructing the vine's sap flow could potentially mitigate the impact of crown gall disease. However, this practice will not eliminate the bacteria from the vine and retraining may be necessary in the future. For grafted vines, ensure healthy replacement shoots originate from above the graft union.
- **Avoid propagation from infected blocks:** Do not collect propagation material from vineyard blocks where visible crown gall symptoms are present, even from vines within those blocks that are not currently displaying symptoms.

- **Promote good soil drainage:** Identify and remediate areas within the vineyard where soil drainage is inadequate, aiming to mitigate the risk of vine impairment or wounding due to waterlogging.
- **Minimise wet and humid conditions:** Young vines growing in full-length vine guards may be more susceptible to crown gall due to increased humidity.
- **Consider a fallow period:** Implementing a fallow period after removal of an infected block can reduce carry-over of bacterial inoculum to new plantings. However, outcomes are highly variable and depend on several factors including the presence of infected plant debris, soil pH and soil moisture.
- **Vineyard hygiene:** [Vinehealth Australia](#) provides protocols on footwear and small tool disinfection, harvester cleaning, and the [Top 10 farm-gate hygiene activities](#) to minimise the potential transmission of pests and diseases from infected vines to healthy ones. However, Vinehealth's resources specifically target phylloxera, not *Agrobacterium* and or *Allorhizobium* bacteria. Vinehealth's current recommendation for disinfecting footwear and small hand tools to prevent the spread of *Agrobacterium* and *Allorhizobium* bacteria is to use undiluted methylated spirits (95% ethanol), which will also be effective against phylloxera. For best practice, growers are advised to undertake a two-step disinfection process, first cleaning footwear of all soil and plant material, then immersing in the disinfectant. To maximise efficacy, securely place a lid over the tub of methylated spirits during daylight hours to prevent breakdown caused by sunlight, and replace the methylated spirits daily, or more frequently if it becomes soiled. Ensure footwear is immersed for at least 60 seconds and not water rinsed thereafter. Caution is advised as undiluted methylated spirits is highly flammable.

## Understanding the risks when sourcing planting material

The endemic nature of crown gall disease and the current difficulty in identifying *Agrobacterium* or *Allorhizobium* in propagation material or soil, means that all producers in the propagation supply chain are unable to provide assurances as to the status of vine material. The unknowns around diagnostics and pathogenicity mean that supply of propagation material to nurseries, or planting material to growers will occur with some risk of the presence of *Agrobacterium* or *Allorhizobium*. It is important that growers placing vine orders, acknowledge and understand these risks, and determine their own acceptable risk level. As always, growers are encouraged to discuss the health of planting material with their suppliers.

Hot water treatment (HWT) is the only currently available method of treating crown gall-infected vine material. However, HWT is known to only reduce, not eliminate *Agrobacterium* from grapevines. The efficacy of HWT has not been tested and documented against all species of *Agrobacterium* or *Allorhizobium*.

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