

Post-harvest care of tired vines

After vintage, the AWRI helpdesk often receives questions about caring for vineyards following the harvest period. **Dr Mardi Longbottom** outlines answers to some of those questions, particularly regarding water and nutrient demands of stressed vines.



My canopy was sparse and there were not many leaves post-harvest. Will this affect vine reserves for next year?

If vines defoliate at or soon after harvest, this may be an indicator of multiple stressors including water, heat, crop load, disease and low carbohydrate reserves. All of these can contribute to low vine reserves next year.

The accumulation of carbohydrates and nutrients starts in spring when the new leaves begin to photosynthesise and vine roots start to actively extract nitrogen and other nutrients from the soil. From veraison onwards, vines start to divert these resources to storage. For this to occur, the rate of photosynthesis must be greater than the demand from the developing canopy and fruit. When vines are carrying a high crop load (i.e. a high yield relative to the capacity of the canopy to ripen the fruit), this can result in low rates of partitioning of reserves.

The rate of photosynthesis can be affected by water stress, nutrient availability, high

temperature and disease. When vines are water stressed, nutrient uptake by the roots is limited. Leaf temperature may also increase during periods of water stress causing stomatal closure and a decline in photosynthesis. High levels of disease on leaves may also limit photosynthesis.

Ideally, vines will have functioning leaves after harvest so that photosynthesis and the generation of carbohydrates can continue, and reserves are partitioned into the woody structures. The principle of post-harvest irrigation and fertiliser application is to maintain the functioning leaves to enable the partitioning of carbohydrates and nutrients into the woody structures for next season.

What are the impacts of low carbohydrate and nutrient reserves?

The severity of symptoms will vary depending on variety, rootstock and seasonal weather conditions. If vines do not have adequate carbohydrate reserves before they enter dormancy, budburst

may be uneven and the vine canopy may be smaller and slower to develop in spring. If carbohydrate reserves are depleted over multiple successive seasons, bunch number and size are also likely to decline.

Nutrient deficiency symptoms including pale and/or distorted leaves or smaller and/or fewer inflorescences may be obvious early in the season. Other nutrient deficiencies symptoms may not become obvious until after flowering. These include poor fruit set (from molybdenum, boron or zinc deficiency) and leaf necrosis (e.g. from magnesium, manganese, potassium and phosphorus deficiency).

Should I apply nitrogen after harvest if the vines are defoliated?

The majority of vine nutrient uptake occurs via annually produced fine roots which, in cool and temperate regions are present between flowering and veraison and sometimes post-harvest, and in hot, irrigated regions may be present



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Proactive weed resistance management

According to the Australian Glyphosate Sustainability Working Group, glyphosate resistance has now been confirmed in 17 different weeds comprising 10 grass and seven broadleaf species. Six of these weeds are predominantly winter-growing and 11 are either non-seasonal or summer-growing. Along with these weeds there are currently 10 weed species listed as resistant to paraquat.

Horticulture is not immune to the risk. Twenty-six glyphosate resistant populations have been confirmed in vine crops throughout Western and South Australia, with another 16 in horticultural crops in New South Wales, Victoria and South Australia.

For a broader perspective on the management options available, go to the Australian Glyphosate Sustainability Working Group website at:

<http://www.glyphosateresistance.org.au/>

Growers should download the document titled Sustainable glyphosate use in Australian orchards and vineyards and secure it to the wall of the office as a constant reminder of the need to minimise the risk of glyphosate resistance in weeds.

For this article I'd like to focus on what growers can do in the next couple of months to reduce the risk. These are:

- Use of a double knock down – full glyphosate (Group M Herbicide) rate followed by a full label rate of paraquat + diquat (Group L Herbicide); and,
- Strategic use of alternate herbicide modes of action including residual herbicides.

The double-knock down, which utilises two different herbicide modes of action in sequence, is a great tool available growers. Generally, it involves applying glyphosate followed by a SPRAY.SEED® application 5 to 10 days later.

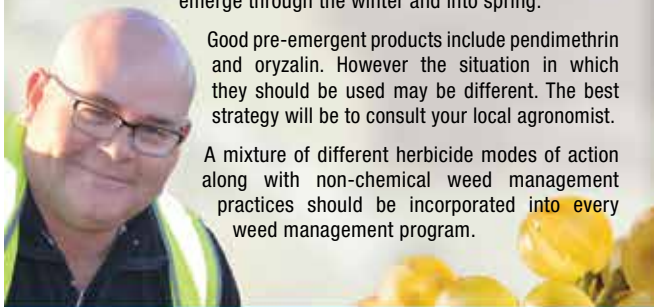
In theory, if any weeds survive, or are resistant to the first glyphosate application, they will be controlled by the second 'double-knock down'.

Important to the success with this is using robust label rates for maximum, consistent control of target weeds.

This sets the vineyard up for the next stage. Bare soil with follow-up rain or irrigation is the best possible scenario for residual herbicides. Getting them on early will help control weeds that would otherwise emerge through the winter and into spring.

Good pre-emergent products include pendimethrin and oryzalin. However the situation in which they should be used may be different. The best strategy will be to consult your local agronomist.

A mixture of different herbicide modes of action along with non-chemical weed management practices should be incorporated into every weed management program.



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throughout the entire growing season. The ability of these roots to take up nutrients is dependent on water and the presence and availability of nutrients in the soil. If the canopy has a high degree (>50%) of defoliation, it is likely that soil moisture has not been sufficient for fine root growth and any nitrogen applied will be wasted.

What can I do next year to give the vines the best start to the season?

Research has shown that it is preferable to maintain water in the soil profile over winter, ideally with natural rainfall, rather than to refill the profile in spring. Vines need access to adequate water in spring to promote even budburst and strong canopy growth. Sufficient soil moisture should also be maintained throughout the season to prevent defoliation prior to harvest. If no nitrogen was applied post-harvest, fertiliser should be applied through the irrigation system around flowering to optimise uptake.

What should I do if my vineyard starts the season with an inadequate supply of water?

Insufficient winter rainfall creates a range of challenges for grapegrowers. There are several steps that growers can take to manage dry conditions, depending on their circumstances.

If irrigation water is available during winter

When irrigation is available, moisture should be maintained in the soil profile by applying irrigation throughout winter. Trials have shown that waiting until spring to fill the soil profile can result in excessive vegetative growth and reduced yields. As temperatures rise in spring and the canopy starts to develop, close attention should be paid to soil moisture, as regular irrigation is likely to be required much earlier than in a wetter season.

If only limited irrigation water is available

If the soil profile is dry and only limited water is available (e.g. from an on-farm dam), then the use of this water needs to be carefully budgeted. A small canopy will use less water, so irrigation should be avoided until canopy growth has stopped. Depending on the amount of water available, irrigation can be applied strategically to prevent defoliation, often starting between fruit set and veraison. The aim of these irrigation applications is as much to sustain the vines as it is to reach a target yield. Blocks with a better return may also be prioritised over blocks where the value of the fruit is likely to be lower.

If water supply is an ongoing challenge, options to maintain soil moisture for as long as possible should be considered. These include mulch and compost which have the additional benefit of lowering the soil temperature and reflecting heat during extreme heat conditions. Maintaining mid-row cover can also reduce the temperature of the vineyard. Over time these options will also increase organic matter and the water-holding capacity of the soil.

For more information about post-harvest care and managing vineyards in dry conditions, please contact the AWRI helpdesk on 08 8313 6600 or helpdesk@awri.com.au.

