compost for soils

Viticulture

Compost for Vineyard Establishment

Vineyard establishment is a crucial time and can shape the future of your production for many years to come. Compost can help your vines get off to a good start and also provide you with significant financial benefits.

Compost can be used in two different ways when you are establishing your vineyard – either as mulch or incorporated into the soil.

Mulches for Vineyard Establishment

Outstanding results have been seen across Australia with the use of mulch at vineyard establishment. Mulch can:

- increase general vine growth
- enhanced root development
- increase trunk diameter (up to 34%)
- significantly increase yield

Compost mulch can increase the yield of vines at first harvest and this increase in yield is generally due to an increase in bunch number, rather than larger berries. Even better - these benefits continue past the first year! Investing in compost mulch at establishment of your vines can pay significant dividends.

Some growers have raised concerns that mulch on young vines will encourage shallow root growth, but this is not the case.

When the root structure of young vines 12 months after planting was monitored in New Zealand (Mundy and Agnew, 2004) - no significant difference was found between unmulched vines (root depth 27cm), vines treated with bark mulch (root depth 36cm) and vines with a compost mulch (root depth 41cm). From these results it looks like mulch can even increase root depth.

Case study – McLaren Flat, South Australia

Twelve month old Cabernet Sauvignon vines growing on deep 'Blewett Springs Sand' were mulched with 75mm of coarse compost, 1m wide undervine, while sections of the block remained without mulch for comparison.
After 6 weeks, vines with mulch showed a 70% increase in shoot length compared to those without mulch. But the benefits did not stop at just vine growth – yield was significantly enhanced in vines with compost mulch.
n each year, the yield of vines with mulch was higher than those without mulch.

Yield* (kg/vine)	Harvest year	1997	1998	1999	2000	2001
	No mulch	0.7	4.9	4.7	7.0	11.7
	Mulch	2.5	7.7	6.3	8.7	14.8

Over the total period, mulched vines yielded almost 40% more or 66.6 t/ha compared to 48.5 t/ha. At today's prices for Cabernet Sauvignon in McLaren Vale, this represents an extra $18,700/ha. This does not include the money that can be saved by reduced irrigation which is often associated with the use of compost mulch link to compost mulch for water saving. Increased yield and decreased water use – using compost mulch is a smart financial decision!

**Source: Buckerfield and Webster (2003) Composted organic wastes for soil rehabilitation: Final report to the Natural Heritage Trust,Canberra*

Additional benefits of compost mulching

Getting your vines off to a good start and increasing yield are both great reasons to use compost mulches, but there are also many additional benefits.

Compost mulches prevent evaporation of moisture from the soil and this can save you a significant amount of water. Conservative estimates place irrigation savings at around 20-30%, although in some cases it can be as high as 70%!

Compost mulch also helps to moderate soil temperature and moisture fluctuations. This reduces plant stress and the risk of crop failure – an important factor to consider, particularly for young vines. Farm management costs can also be lowered by the decreased need for fertiliser and herbicide application.
These are all great reasons to be using compost mulches.

Mulch application recommendations

When using compost mulch at vineyard establishment, coarsely textured compost mulch is recommended. Mulch can be applied at depths up to 75mm, 40cm undervine depending on the compost texture. This will assist in young vine establishment and could advance the profitability of the vineyard.

Texture and application rate are two crucial aspects to consider when choosing your compost mulch. Coarse textured compost is the most appropriate for use as mulch. It should have larger woody particles, which help water and air reach the soil easily.

Finer textured materials can act faster to improve soil structure and water holding capacity, but can also trap water, preventing it from reaching the soil. The decision to choose coarse or fine textured mulch will depend on the specific needs of your vineyard. An application rate of 50-75mm is recommended for coarse materials, and rates should not exceed 100mm. Mulches of finer texture can be applied at 25mm, but they should never be applied at high rates (not higher than 50mm).

Advantages of mulches

- Better management of yield and quality
- Increase soil capacity to capture and store water
- Moderate soil moisture and temperature fluctuations - decreased risk of crop failure
- Reduced farm management costs
- Improved soil structure and decreased erosion

Soil Incorporation of Compost at Establishment

Incorporating compost into the soil can also provide benefits at vine establishment by increasing vine growth while at the same time improving soil structure.

Young vines can grow taller when compost is incorporated into the soil. and at the same time, the infiltration rate is increased and soil strength is reduced.

10 months after establishment, vines which had spent mushroom compost incorporated along the vine row prior to planting, were taller than those without incorporated compost.

In the examples below, compost was applied at 85m^3/ha and mixed to a depth of about 20cm to give a soil concentration of around 20-25%.

The benefits of increased vine growth make incorporation of compost into the soil worthwhile; vineyard variability can be minimised and training of young vines can be managed more efficiently.

Mounded or ripped soils can also benefit by incorporation of compost, as good soil structure is maintained over a longer period of time. Incorporation of compost in mounded soil can increase root length and help to stabilise the mounds over for longer.

A rapid decline in soil structure is often seen after ripping has taken place, and this can be due to the re-welding of the soil fragments. Re-welding can be prevented by placing a physical barrier between the fragments – and here is where compost incorporation can be of benefit.

Applying 5-20 t/ha of compost and mixing it in with the soil can help you avoid re-welding of your newly renovated soil.

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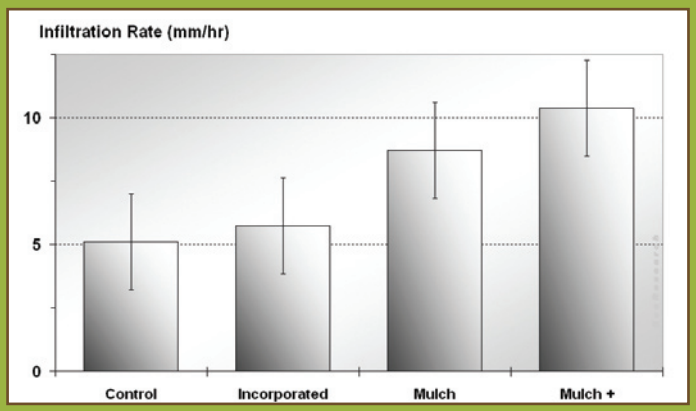

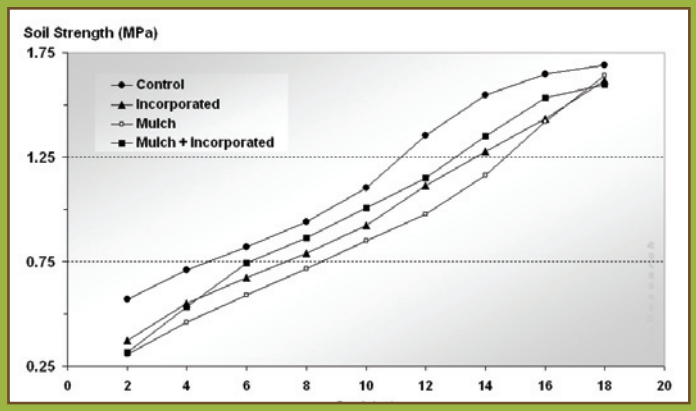

Current recommendations:

It is important to note that when incorporated in the soil, young vine roots are in intimate contact with the compost, and may be particularly susceptible to any detrimental effects such as excessive moisture holding or phytotoxicity. Where compost is incorporated in the soil, it is essential that quality, mature, stabilized, non-phytotoxic, composts are used.

Soil incorporation at establishment - applications of quality compost which give a 20-25% concentration once mixed in the soil have been shown to be beneficial. While detrimental effects with higher application rates have not been confirmed, additional benefits have not been shown either.

During mound formation and following ripping - Composts can also be incorporated during formation of mounds (60-100 t/ha) and to assist maintenance of soil structure following ripping and cultivation at rates of 5-20t/ha.

What's right for you?

Using compost mulch or soil incorporation of compost (or both!) at vineyard establishment will give your vines a great head start. To get the most out of your compost it is important that you choose the right compost type for your needs.

Carbon to Nitrogen Ratio

An important quality of compost for soil incorporation is the carbon to nitrogen ratio (C:N). This ratio should be below 20:1 to ensure that there is not 'nitrogen draw-down'. Nitrogen draw-down occurs when there is not enough nitrogen in the compost to allow breakdown of woody particles. Microbes will draw nitrogen from the soil to break down this material, reducing the pool of nitrogen available to the vines.

Choosing Compost Checklist

- **Does it meet the Australian standards?**
- **Do you know what it's made of?**
- **Have you seen a recent compost analysis?**
- **Is it free of contaminants?**
- **Is the compost free from bad odours?**
- **Is it cool and not too hot?**
- **Do you have the right grade for your needs?**
- **Have you checked the correct application rate?**

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the resource for compost users