



Compost for wine – a case study from Tyrrell’s Wines, Hunter Valley, NSW

Who

Andrew Pengilly, Tyrrell’s Wines

Where

Pokolbin, Hunter Valley, NSW

What

Wine grapes

Aim

Improve soil and plant health to increase yield and grape quality from 80 year old vines

Outcomes

- increased income through improved grape quality (over \$30,000)
- improved moisture retention
- improved canopy colour
- leaves stayed longer on vines
- reduced herbicide use
- decreased use of synthetic fertilisers

Tyrrell’s Wines

Tyrrell’s wines are one of the most successful privately owned wine companies in Australia, and are based in the Hunter Valley in NSW, a premier wine growing region. Edward Tyrrell founded the family business in 1858 and his great grandson is the current managing director. Tyrrell’s have vineyards in the McLaren Vale and Limestone Coast regions of South Australia

and the Heathcote region in Victoria. Tyrrell’s manage just over 364ha of vineyards, mainly Semillon and Shiraz. The flagship of the Tyrrell’s wine range is the VAT 1 Hunter Semillon, produced from vines that are over 80 years old, located at Pokolbin in the lower Hunter Valley. Tyrrell’s take pride in championing the signature variety of the region, Semillon.



Why compost?

Tyrrell's noted a gradual decrease in yield from one of the blocks where their VAT 1 Semillon is grown. The canopy growth had become irregular and sun burning was a major problem. After 80 years of production and years of minimal inputs, quality was becoming less consistent and the soil was compacted.

In 2009, Andrew Pengilly, Pokolbin Vineyard Manager at Tyrrell's was approached by Darren Fahey, Compost for Soils NSW, to run a trial funded by the Office of Environment and Heritage. The aim was to see if composted mulch could improve the health of the soil and vines as well as increase grape quality and yield. Andrew had had good results working with composted mulch in other South Australian vineyards and was keen to see what mulch could do for the block at Tyrrell's. Composted mulch was chosen to increase nutrient availability and provide organic matter to improve soil structure and increase water retention in the dry grown block.

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“For a season that had low tonnages and high pH throughout the district, the mulched block seemed to perform above the rest.” Andrew Pengilly

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“Berries are larger which means the wine becomes softer and more elegant.” The winemakers at Tyrrell's

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Composted mulch

Composted mulch protects the soil surface and moderates fluctuations in soil moisture and temperature making more of the top soil suitable for vine growth. Mulch also extends the depth of the root zone by reducing soil strength and optimising growth of fine vine roots. Composted mulch can help increase the soil volume for optimum vine growth, without the costly expense of mounding.

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.

For coarse materials, an application rate of 50–75 mm is recommended, 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). Once you have chosen the right compost, it is important to make the most of it! Good monitoring of soil moisture is vital to ensure that you are not irrigating unnecessarily.



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“It’s very hard to put a dollar value on soil health, my feeling is that it can make or break a block or company.” Andrew Pengilly

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Compost soil conditioner

Compost soil conditioner improves the physical and chemical properties of soil, increases water infiltration, decreases irrigation requirements and increases yield. Although not a primary function, compost can also supply vital nutrients to your crop. Compost may enhance the soil nutrient status in your vineyard but this will vary depending on the type of compost applied, soil type, vineyard location, climate and your management practices.

Compost incorporated into soil as a soil conditioner should always be fully composted and stabilised. As this material will often come in direct contact with the plant it should be of high quality and not phytotoxic (toxic to plants). Rates of application for soil incorporation will depend on your specific situation. For example, at vineyard establishment, rates of 50mm deep mixed to 20cm deep in sandy soils and 10cm in heavy soils can give substantial benefits. When ripping for soil renovation, apply compost at 5–10 t/ha on the rip line and incorporate by discing. At the same time, around 8 t/ha is recommended for spreading evenly across the mid row for incorporation as deeply as possible.

Monitoring soil and plant nutrient levels can also help achieve best value from compost applications. Fertiliser programs may need to be adjusted to account for the extra benefits your vineyard will receive.

The compost product

In consultation with Darren, Tyrrell’s chose to apply composted mulch and composted soil conditioner in an 80:20 blend. Both products were from a commercial supplier and were produced according to the Australian Standard AS4454. A soil conditioner was included in the blend to quickly supply nutrients to the plants and to have a greater impact on soil biology than could be achieved by using mulch on its own. This compost blend was applied to vines in spring for a side by side comparison with other vines where no compost had been applied.

A band of composted mulch 50cm wide and 5cm deep was applied under vines, the equivalent of approximately 85m³/ha. Tyrrell’s initially had problems accessing the right equipment to apply the mulch to vine rows but eventually sourced it from a local landscape supplier and applied the compost themselves. The narrow row spacing in this block, approximately 2.5m, made access difficult as they try not to drive on the edges of the mulch. Cultivation and slashing for weed control threw soil onto the mulched rows or disturbed the mulch, so some mulch had to be removed from the base of vines.

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“The canopy is more vibrant, richer in colour and leaves last longer through to the end of the season.” Andrew Pengilly

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The bottom line

The benefits of using the compost blend were numerous and were seen much sooner than anyone involved in the trial expected. Nine months after applying the compost blend, the soil around treated vines had better moisture retention, was less compacted and needed fewer herbicide applications. There was a visible improvement in the colour of the canopy, the leaves lasted on the vines until the end of the season and grape quality improved markedly. The winemakers at Tyrrell’s determined that the juice analysis was ideal for long term Semillon wines.

The impact of compost

A range of aspects were measured to assess the impact of compost application including soil moisture tension, soil temperature, soil organic carbon, soil compaction, bunch and berry weights, yield/hectare, pruning weights, bunchzone temperature and analysis of the juice from berries. The economic benefit of increasing fruit quality was also estimated.

Increased income through quality and yield

All of the positive outcomes from using composted mulch have added up to financial benefits for the company. Composted mulch helped improve the yield and quality of fruit produced from the block which meant a \$30,000 increase in income for the company. The block generally produces around 1 tonne of grapes each year. If the grapes make first tier they go into Tyrrell's VAT 1 wine. Sixty five cases retailing at \$60/bottle equates to an income of approximately \$46,800. If the quality is lower and only reaches second tier, the grapes go into a wine that retails around \$20/bottle, equating to around \$15,600. Previously VAT 1 wine had not been consistently made from this block and only very low tonnages had been achieved.

Yield increased after application of compost mulch. Previously the tonnages from the block had been very low, but in 2009–10 were up almost 30%. Berries on mulched vines were heavier than berries from unmulched vines and had much less sunburn. The canes in mulched vines were also stronger, the internode lengths longer and there was reduced disease pressure because bunches weren't as condensed.

Temperature control

Conditions in mulched vines were more conducive to producing high quality berries than conditions in unmulched vines. The temperatures in the bunch zone were much lower in mulched vines. On the hottest day in the 2009–10 season, the maximum bunch temperature was reduced by 0.4–1.2°C in mulched vines compared to unmulched vines. The bunches on mulched vines spent less time exposed to temperatures above 35°C and more time in the optimal temperature range of 15–35°C.

Weed control

There were also benefits for weed control - mulched vines required only two herbicide applications (cost = \$17.34) throughout the season, whereas unmulched vines needed four applications (cost = \$34.68). While the money saved through fewer herbicide applications may seem small on this 0.16ha block, the savings can quickly grow if a larger area is covered.



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“Winemakers liked what they saw in the paddock as well as the juice analysis results.” Andrew Pengilly

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Where to from here?

Results from the first year of using a compost blend were so promising; Tyrrell's continue to use compost products in their vineyards. In 2010, Tyrrell's commenced a new mulch trial in a Shiraz block growing in poor soils and renowned for early leaf drop. The aim here is to see if they can increase soil health and structure and improve leaf retention and fruit quality. Soil additives were applied, based on soil tests and mulch was applied during the growing season instead of in spring. Tyrrell's are keen to continue exploring how compost products can improve the health of their grapes and their soils.

For more information on the program contact:



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