

## Mulching and Its Impact on Weed Control, Vine Nutrition, Yield, and Quality

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### Abstract

*One of the major constraints to the adoption of organic viticulture is the problem with weed control in the undervine area. Conventional weed control systems using a variety of mechanical devices are still seen as the most effective practice, but this has its drawbacks. Some of the implements are quite aggressive in their actions, which are likely to harm soil structure with frequent passes. Many are slow, are only effective on small weeds, or are very expensive and beyond the reach of many growers on small properties. Alternatives to mechanical weeding that are acceptable by the organic standards are limited to thermal practices and botanical herbicides, which are also very expensive.*

*The use of undervine mulches as a means of smothering weeds, therefore, required further investigation. A range of commercially available mulching materials (e.g., jute matting, compost made from grape marc or recycled organic products, grape stalks, and cereal straw) were trialed at four South Australian vineyards which provided very different environmental conditions, with rainfall varying from 250 mm to 600 mm annually. Aside from impacts on weed suppression, the various treatments were also assessed on their impact on soil chemistry, vine nutrition, vine yield, and grape quality.*

*When considering weed suppression only, the use of cereal straw applied at least 20 cms deep was the most cost effective, except at the hot, dry Riverland site, where grape stalks were available for free, and they worked quite effectively. Composts also provided very useful weed control, but their cost of over \$3,000/ha made their justification on weed control benefits alone very difficult.*

*The yield benefits of the mulches were very site specific, and depended on the mulches' capacity to address the yield-limiting factors of each site. The greatest yield response (50%) occurred at Langhorne Creek on a soil type which reacted favorably to the increased nutrition provided by the compost. While some water savings were evident from the application of mulches, it was insignificant compared to the water applied at the Riverland site, where fertigation also nullified any nutrient benefit in the mulches.*

*Application of mulches impacted on the soil chemistry quite differently across the sites. A large increase in soil nitrogen at the Langhorne Creek site was a major influence on the yield increase. Massive increases in soil potassium (338% with grape marc compost) did not raise the berry pH, which was a concern with the use of this product. Cereal straw also led to increased soil pH, but again this was not reflected in must pH.*

*From this work it was concluded that it is difficult to realize the investment in undervine mulching purely on their weed suppression abilities. Other benefits such as improved vine nutrition or soil moisture conservation may result in higher yields and thereby repay the cost of mulching. However, where weed control and moisture conservation are the primary objectives, cereal straw and grape stalks are the cheapest and therefore most cost-effective raw material to use. The compost products in some environments will provide nutrient benefits to the vine, which can have significant effects on yield and, to a lesser degree, quality.*

*The outcomes of this work emphasize the need for trials to be conducted on-site by the growers rather than relying on research results generated at other sites where management and environment may be quite different.*

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