compost for soils

# Viticulture

## Compost for Managing Salinity

Almost a third of all agricultural land in Australia is affected by salinity or sodicity and this is increasing. Viticultural lands have not escaped the problems of salinity and sodicity, and these issues are becoming more widespread. This is not helped by the fact that Australian viticultural soils are often naturally sodic or prone to salt accumulation.

Compost plays an important role in managing sodic and saline soils, and can help you begin to tackle these problems with confidence.

### Sodic or Saline ? What is the difference?

#### Saline Soils

Sodium bonds with chlorine in the soil to form a salt. This reduces the availability of water to plants and can even cause plant death when high levels are present in the soil.

#### Sodic Soils

Most of the chlorine has been washed away, leaving behind the sodium. Without its accomplice chlorine, sodium attaches to tiny clay particles in the soil. This makes the clay particles lose their ability to stick together when wet and leads to soil instability. Sodic soils are prone to erosion and waterlogging.

## Managing Sodic Soils

As a general guide, a soil is regarded as sodic where exchangeable sodium is higher than 6%, and the pH is greater than 8.5. Sodic soils can be managed by incorporating products containing calcium into the soil – the most often used is gypsum. Compost can play an important role in helping gypsum spread through the soil, increasing the efficiency of your amendments.

Compost can do this for you in a number of ways. In general, biological activity in the soil is increased when compost is used. In particular, compost mulch can provide a food source for earthworms. Providing earthworms with food can increase their burrowing and casting activity and this helps to mix amendments into your soil.

One of the well-known benefits of applying compost mulch is an increase in the water infiltration rate of the soil. With an increased infiltration rate, amendments can more easily move from the soil surface into the soil profile where they can begin to address any sodicity problems.

In these ways, compost mulch can assist in the incorporation of gypsum to a depth in the soil where cultivation is not possible. This can provide a longer term solution to your sodicity problems. Applying mulch after your amendment can assist the penetration and effectiveness of the amendment in the soil - and give you more value for money!

### Remediation of Sodic Soils

| | Exchangeable sodium levels | |
|---|---|---|
| | Before Remediation | After Remediation |
| Vineyard 1 | 19.8% | 7.0% |
| Vineyard 2 | 21.2% | 7.0% |

Sodicity was reduced significantly following remediation. Remediation was achieved using mounding, ripping, lime, gypsum and organic matter incorporation (compost: 250m3/ha).

Compost has also been shown to be effective in helping to reduce sodicity when incorporated in a strategy of mounding and ripping, and application of lime and gypsum. In some cases, exchangeable sodium levels were at least halved while exchangeable calcium increased, when this strategy was employed. This demonstrates the potential role of soil incorporated compost in a sodicity management strategy.

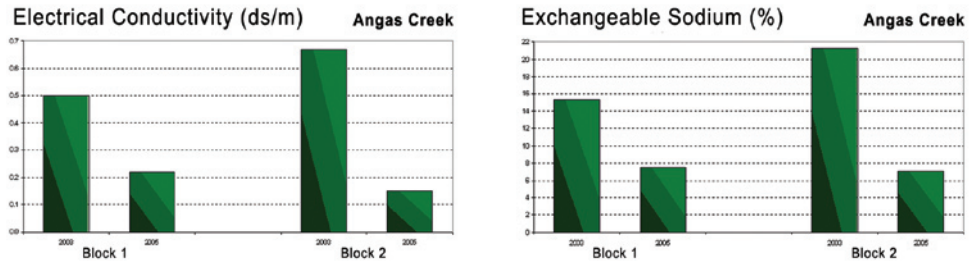


*Figure 1*
*Changes in electrical conductivity (dS/m) and exchangeable sodium (%) in two vineyard blocks before and after remediation. Compost mulch: 250m³/ha.*

# Managing Saline Soils

Salinity can have a major impact on soil structure, vine yield and also wine quality. The general threshold for saline soils in Australian viticulture is a soil saturation paste electrical conductivity of 2.6 dS/m. Research has found that with every 1.0 dS/m increase over this threshold a 9.3% decrease in yield occurs. Remediating saline soils is a significant challenge, but compost can assist in this process.

One of the great advantages of using compost mulch is the improved soil structure that often results. With improved soil structure and increasing water filtration into the soil, there is a greater efficiency of leaching - this aids in the management of saline soils. Mulches also reduce evaporation and as a consequence, prevent the accumulation of salts at the soil surface. More leaching into the soil and less evaporation leads to a more hospitable growing environment.

Compost mulch can give your vines the optimum surroundings for root growth whilst managing your saline soils.

Remediation of saline soils is similar to that for sodic soils – mounding, ripping and application of lime, gypsum and organic matter – and great results have been seen using this approach.

Figure 1 shows two saline soil vineyards where electrical conductivity and exchangeable sodium were reduced. At the same time, yield and pruning weights increased significantly. Changes can also be seen in the biological properties of these soils, with double the population size of bacteria, fungi and earthworms associated with 20-40% increases in soil organic matter.

In a similar study, yield of Semillion increased by 23%, (due largely to an 18% increase in grape yield), following the implementation of the salinity remediation strategy. The benefits flowed on to the following season when yield increased by 7%. This was due to a 10% increase in bunch number and 3% reduction in berry size.

Yield increases seen after soil remediation were valued at $3,400, a return which immediately started to offset the cost of soil works.

When this remediation approach was used in areas of low salinity, little change was seen. This gives an indication that 'spot treating' high saline areas of your vineyard with compost can help remediate these saline soils whilst at the same time reduce vineyard variability.

Undertaking broad scale surveys of salinity on your property and targeting the use of compost and other soil amendments to problem areas can give you great results. At the same time, you are making your compost work harder for you by applying it where it can give you the most benefit.

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