compost for soils

Guide your Compost Application

Using soil and plant test results to guide your compost application

Soil management and healthy plant growth is almost always made easier with the addition of organic matter. Compost used as a soil conditioner, adds a significant amount of organic matter as well as key nutrients to the soil.

Compost can be used to:

- save water
- improve soil structure
- add nutrients to your soil
- create better conditions for plant growth
- suppress plant diseases.

Many other benefits have also been reported including:

- easier tillage with reduced diesel use
- more even maturation of crops, requiring fewer harvest passes with associated labour and fuel savings
- reducing water and wind erosion improved water quality from runoff
- saving time and money.

As with all soil amendments, applying compost must follow the crop nutrient demand. The fertiliser value of compost must be subtracted from the standard fertiliser crop requirements. Of course compost application costs money, so it's important to get the best possible value from it. Soil tests will help you to decide which parts of your farm or amenity areas will benefit the most from compost amendment.

Compost use can address:

Low soil organic matter

Soils with organic matter less than 3.5% for clays, and 2.5% for lighter soils are likely to benefit most from the addition of organic matter from compost. Increased soil organic matter supports the soils nutrient and water holding and helps create a greater diversity and number of soil organisms that can assist in nutrient turnover and building of soil structure. Soil microbes create the 'glue' that sticks soil particles together, creating the variety of soil crumbs and pore spaces that make up good soil structure.

Low cation exchange capacity

Soils with low cation exchange capacity, especially sandy soils (<5 meq/100g) benefit from addition of soil organic matter which creates better conditions for nutrient retention and uptake by plants. Compost contains humus, that loosely binds nutrients and builds up the capacity of the soil to store and release nutrients for plant growth.

Low soil pH

(limiting the availability of nutrients)

With regard to composts' effects on soil pH, most composts have a neutralising value of 5% calcium carbonate equivalent in the dry matter (3% in fresh compost), compared with 50% for ground limestone or chalk. For example, the neutralizing value of 30 tonnes of fresh compost is roughly equivalent to 2 tonnes of limestone. With repeated applications at this rate, soil would either maintain or slightly increase in pH over time. The rate of change of soil pH would also be influenced by soil texture; soils low in clay content (conversely high in sands) would be more subject to changes in pH than soils higher in clay content.

For example, in loamy soil to which compost was applied at a rate of 16 tonnes/acre (35 t/ha), soil organic matter increased from 1.1% to 2.5%, pH raised from 6.8 to 7.1 and the cation exchange capacity (CEC) increased from 14.4 to 20.1 meq/100g. Greater increases were associated with higher compost application rates. For a clay soil, effects were less marked. Organic matter increased from 3.2 to 4.4 %, pH was raised from 7.6 to 7.7 and CEC increased from 54.2 to 55.8 meq/100g. This shows that greater benefits can be conferred on lighter textured soils.

Imbalance between plant and soil nutrients
If your soil test is showing adequate levels of nutrients such as potassium and trace elements but your tissue test is showing deficiency, then your soil is capable of storing adequate nutrient reserves but is unable to release them to the plant. By adding organic matter, you can encourage greater activity of soil microbes, which are able to change the environment immediately, encouraging nutrient release and availability. Compost is a good source of plant nutrients, and also of 'food' for endemic soil microbes, encouraging them to multiply and do their work in the soil.

High salinity
Sodium can bond with chlorine in the soil to form salt. Saline soils are characterised by high levels of salt and this can reduce the availability of water to plants and even cause plant death. Under irrigation, it is normal for salinity to build up during the season when water inputs may carry a salt load, and evaporation concentrates salts in the upper soil. Salinity (EC) levels above 0.15 dS/m may begin to cause problems. Usually, this is managed with some good rainfall or a leaching irrigation to flush salts through. However, the efficiency of leaching can be impaired when the soil has poor structure. One of the most commonly seen effects where compost is used is improved soil structure and water infiltration. Better infiltration ensures water is able to move into the soil and percolate through it, rather than pooling on the surface, evaporating or running off slopes before it can do its job. Salts are then more easily flushed away with improved water infiltration. While not being able to reduce salinity, compost use improves plant growth in saline soils. This might be particularly helpful in situations where farmers have to rely on good rains for flushing out the salt.

Soil compaction
Soil is made up of large and small particles of soil and organic matter as well as pockets of air - these components give it structure. The pockets of air in soil are often called pores and the amount of space in the soil determines its 'porosity'. Small pores (micropores) are important for water storage, while large pores (macropores) are important for water infiltration and drainage, air movement and root growth.

When the soil structure is disturbed, soil can become compacted and porosity is lost. Even a thin seal or crust, often just formed by raindrops on bare soil, can reduce infiltration rates and increase run off and erosion. Once this occurs it is difficult to remedy and tillage or mechanical action is needed. Adding compost at this time helps to maintain the macropore structure created by tillage as organic matter coats the clods and holds the macropores together.

Choosing the product that is right for you

It is important to always choose good quality compost products for your desired application.

All composts intended for unrestricted use must meet the Australian Standards (AS4454) as a minimum and this is the first criteria point when choosing a compost product. You should ask your compost supplier to provide a recent analyses of the product indicating how it meets the Australian Standard and what is the recommended use of the product.

Some compost may not be fully compliant with the Australian Standard and may only be suitable for restricted use. These products are often suitable for a limited range of soils types, specific plants/crops or are safe for use at lower application rates or fallow.

In these situations make sure you follow guidelines for application provided by the manufacturer or by the relevant regulatory agency.

Your compost supplier is also a great source of information - talk to them about how you would like to use compost, your soil type and the proposed application and they will be able to recommend or develop a product to suit your specific needs.

Once you have chosen the right compost, it is important to make the most of it! Good monitoring of soil properties such as moisture is vital to ensure that you are not irrigating unnecessarily.

Monitoring soil and plant nutrient levels after application can also help achieve the best results from the compost application.

Fertiliser applications will need to be adjusted to account for the extra nutrients you will receive from compost application. To fully account for the nutrient benefits from compost use and to save on fertiliser costs, you will need to include its nutrient supply in your nutrient budget.

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An initiative of Compost Australia

For more information and a list of quality suppliers, go to
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