Department of Primary Industries

primefact

Using recycled organics in blueberry farming

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What are recycled organics?

Recycled organics are a mixture of organics waste that have been processed (through mechanical and natural means) into a safe, usable product – compost. Sources of organics waste include tree branches and leaves, green waste and fruit and vegetable scraps. These products, once processed, are high in organic matter and can contain nutrients for plant growth and can improve soil moisture and increase soil biological activity.

Potential benefits of recycled organics

Figure 1. Compost made from recycled organics

Recycled organics can provide nutrients to plants, stimulate beneficial microbes, improve soil structure, and help the soil retain nutrients and increase water availability for improved plant growth. Additional organic matter can also reduce soil erosion and improve drainage and rainfall infiltration. Maintaining a healthy soil can lead to improved productivity and profitable horticultural production. Using recycled organics also reduces organics waste lost to landfill.

What to look for when purchasing recycled organics

There are different forms and qualities of recycled organics. Commercial compost made from recycled organics should be certified under Australian Standard *AS 4454-2012 Composts, soil conditioners and mulches*. This standard ensures the material is safe to use, has a consistent quality, is free from heavy metals, excessive glass and plastics, and not contaminated by plant or animal pathogens or weeds.

Non-certified organics should be avoided as they can contain contaminants or might not be safe for immediate application. You should select a product that is certified, comes with a laboratory report and addresses the limitations of your particular soil type. Talk to an independent agronomist about your requirements and which products might best improve your soil.

In NSW, the application of recycled organics onto land is regulated through resource recovery orders and exemptions. These set out the criteria for the safe production and application of the product. Growers are advised to ask the compost producer for the test results of material supplied to ensure that it meets all the chemical and other material requirements. Read The Compost Exemption 2016, available from the NSW Environment Protection Authority website.

In addition to state and federal government standards, the fresh-produce industry uses a food safety certification called Freshcare. Freshcare operates as a code of practice that gives users confidence that the material, when used correctly, will not affect product marketability. It references the Food safety and quality edition 4 (FSQ4) and to meet requirements, additives must be treated by an approved process with recorded evidence of compliance. For recycled organics, this includes sourcing from approved suppliers, time/temperature/treatment information, product composition, bacterial counts, batch IDs, withholding period (if any), certificate of analysis and batch-tracing capability.

Blueberry case study

Figure 2. Side throw belt spreader (above) and compost blower (below).

Case studies on two blueberry farms near Woolgoolga in northern NSW demonstrated application methods for recycled organics and investigated the benefits of applying them to the soil. The treatments studied were:

- grower standard practice using weedmat
- compost plus weedmat
- compost plus woodchip application.

The recycled organics material chosen was compost obtained from Biomass Solutions in Coffs Harbour. This compost was certified and laboratory tested, had a pH of 7.8, a carbon–nitrogen ratio of 15:1, moisture content of 47%, particle size <5 mm of 80% and a range of useful nutrients. Soil and leaf chemistry, plant growth, soil moisture and soil temperature were monitored throughout the trial.

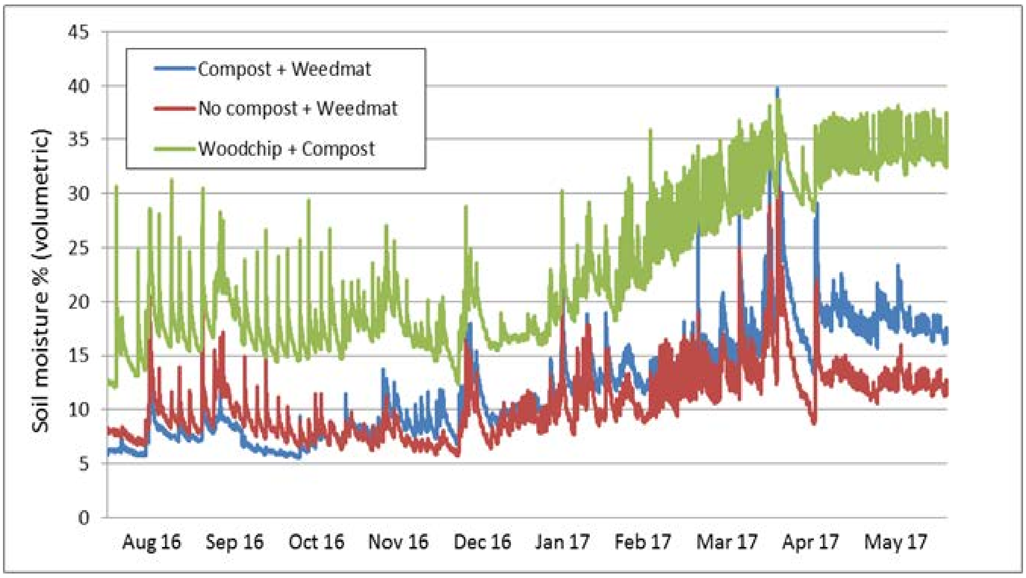
Application methods

Compost and woodchip were applied to blueberry mounds using a commercial compost blower and a side-throw commercial compost belt spreader. The compost blower accessed the steep and difficult sites and could blow compost from a hose up to 120 m from the all-wheel-drive truck. The side thrower applied the compost faster than the compost blower and spread material quickly on accessible land. Choosing the right application method for your situation will come down to practicality, economics and availability.

Soil moisture availability

Soil moisture was monitored at six locations (two probes in each of the three treatments) using Campbell Scientific TDR soil moisture sensors. Moisture content was highest in the compost plus woodchip treatment throughout the trial, most likely to due to a combination of reduced evaporation and the woodchip's increased infiltration capacity compared with the plastic weedmat cover, which has a tendency to shed rainfall. The woodchip used in the trial was also a lighter colour than the black weedmat, possibly promoting solar radiation reflection.

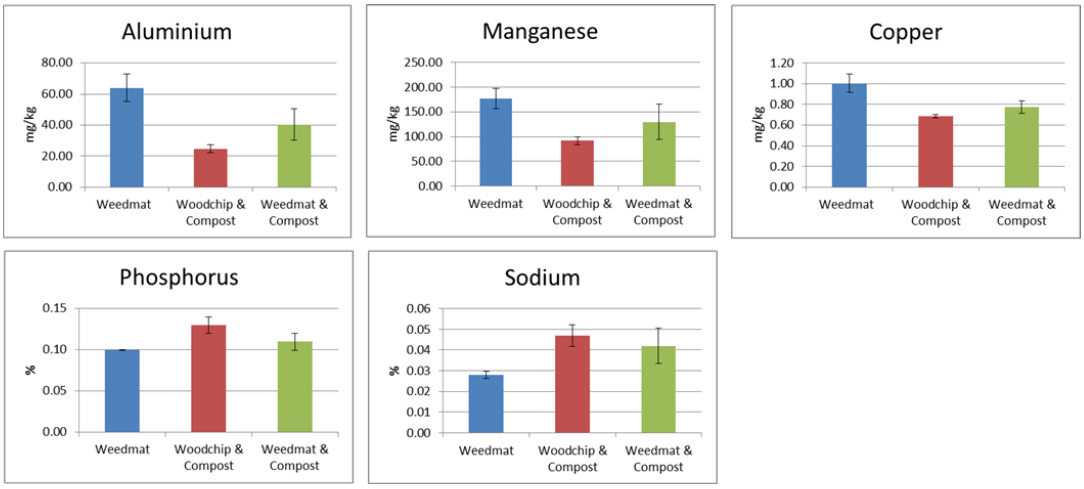
Figure 3. Average soil moisture content was highest in the woodchip plus compost treatment.



Chemistry

Before the trial, the soil was acidic (pH around 4.5), low in organic carbon (1%) and sodic (exchangeable sodium percentage >5%). On average, 10 months following application, the pH in the compost treatments was 5.5, soil organic carbon was 2% and soil sodicity was <3.5%. Soil in composted plots had improved potassium, calcium, magnesium, boron and copper, and reduced sulphur and aluminium. However, not all the micronutrients were available to the plants. Leaf analysis showed a significant reduction (deficiency) in copper levels in the composted treatments despite copper levels being higher in the soil. This may be due to the increased organic matter binding certain metals and warrants further investigation. Any changes in soil pH following compost application need to be carefully monitored, as blueberries prefer acidic soils.

Figure 4. Selected leaf analysis results 14 months after application. Aluminium and manganese were lower in composted plots, likely as a result of increasing soil pH. Copper was reduced (and deficient) in leaves of composted plots despite being raised in the soil. Phosphorus and sodium increased slightly in blueberry leaves of compost plots. Error bars represent a single standard deviation from the mean.



Insect pests, plant health and other observations

Figure 5. Insect activity under recycled organics amendments should be monitored. Cutworms are shown on the bottom left of the image and chewing damage is evident on the edges of the leaves.

Cutworm activity increased in the root zone of some of the blueberry plants, particularly under the compost plus woodchip treatment. This might be due to the increased moisture levels and habitat provided by the woodchip. Cutworms shelter in the soil and under leaf litter and woodchip during the day and feed on plants at night. Early detection, through monitoring the root zone, and appropriate control methods will reduce pest damage.

Blueberries prefer acidic soils and if young blueberry plants are grown in an alkaline soil, their leaves turn yellow, can often then turn brown, are small and are dropped by the plant. Growth is slow and plants can die.

Plant growth was significantly reduced in the compost with or without woodchip treatments. It is thought that this was due to a combination of the cutworm activity and the young plants being planted directly into the alkaline pH compost (pH 7.8).

Erosion control and soil stability

During the trials, two east-coast lows hit the demonstration site in Coffs Harbour with over 250 mm and 140 mm of rainfall. After 12 months, the compost remained in place on the blueberry mounds. Healthy blueberry roots were evident in the demonstration site under both the compost and woodchip treatments, with numerous fine feeder roots visible growing into the organic matter layer.

Figure 6. After large rainfall events the compost and woodchip remained in place on blueberry mounds.

Conclusions

- Both the compost blower and side-throw spreader successfully applied the compost onto blueberry mounds. The spreader was faster on level ground with good access where the trial and demonstrations occurred.
- Compost applications increased soil organic matter, phosphorus, calcium and potassium, raised soil pH and reduced soil sodicity. However, the increase in pH might not be an advantage on all sites because blueberries prefer acidic soils.
- Higher trace element (e.g. copper) availability in the compost-treated soil did not result in higher levels in blueberry leaves. It could be possible that the organic matter is binding some metals, reducing their plant availability. This warrants further investigation.
- The compost plus woodchip treatment held significantly higher moisture content than the weedmat treatments (with or without compost). This can be a benefit, especially if irrigation water is limited or costly. However, this additional moisture might have attracted cutworms, which damaged the plants. Insect pest monitoring should be undertaken if recycled organics are applied.
- The compost and woodchip remained in place on the blueberry mounds after a series of large rainfall events and can be useful to manage soil erosion.

More information

For more information about this project, please contact Matthew Weinert, phone number: (02) 6626 1352.

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