# Growing fertile soils with compost

*A deficient soil can reach optimal nutrient levels with compost.*

## Description of Trial

- High rainfall area located 30km northeast of Heywood with annual rainfall of 840mm.
- Soil is slightly acidic silty loam, initially deficient in NPK.
- Rye grass pasture grazed and cut for hay.
- Compost spread in Autumn 2023 with soil tests in May 2024.

## Background

Agricultural practices deplete important plant nutrients through the repetitive removal of plant matter from the area where it is grown. Nutrients are moved from the soil to the plant, and when the crop is harvested, those nutrients are permanently removed from the land. After many years of harvest and nutrient removal, the soil becomes deficient and is unable to reach its full potential.

This trial provides evidence that supports the use of compost to return depleted nutrients to agricultural soils. Simultaneously, increased plant growth was observed in this paddock where compost was applied. The application of compost not only reverses the negative impact of long-term agricultural production but also diverts waste from landfill, transforming it into a useful and sustainable resource.

## Trial Outline

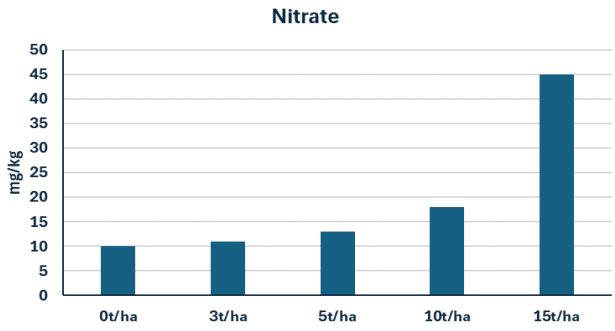
This trial compared five different rates of Bio Compost (15 t/ha, 10 t/ha, 5 t/ha, 3 t/ha, and 0 t/ha) in a dryland pasture and hay paddock. The product supplied for this trial was composted and produced at Bio Gro's Wandilo facility, located 10km North of Mount Gambier, SA.

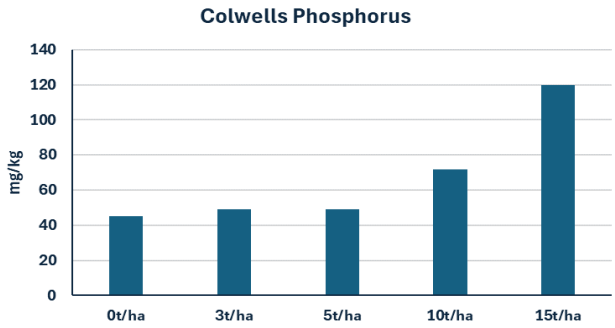
The chosen paddock was divided into four sections, each approximately 48 m wide, with 15 m wide control strips between them. Each section was spread with a different rate of compost before sowing in 2023. Rye grass was sown and then harvested for hay in the spring of 2023. Excluding the compost application, all other management practices were uniform across the paddock.

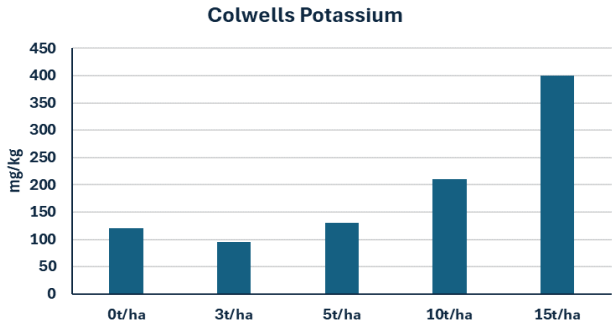
No quantitative plant data was collected. Soil samples extracted from each plot and from one control strip in May 2024 were analysed externally for results.

## Results

- Compost applications saw an increase in the NPK nutrient levels, the key nutrients for plant growth that are commonly the most limiting in agriculture.
- Higher application rates saw a uniform increase in plant growth.
- Visual observations included reduced populations of major weeds, including capeweed, in plots containing high rates of compost.
- This deficient soil reached optimal levels of macro- and micronutrients for plant growth particularly in the 10t/ha and 15t/ha treatments.




## Conclusion

The valuable nutrients in compost can be transferred into agricultural soils. The benefits of applying compost extend beyond the increased agricultural production. Composting is good for the environment as it is a renewable resource that utilises wastes and diverts them from landfill. Additionally, adding compost returns nutrients lost from many years of harvest to promote a healthy soil.

# SOIL ANALYSIS

| | | | |
|---|---|---|---|
| **Agent:** | Van Schaiks Biogro | **Report Date:** | 03/06/2024 |
| **Agent Address:** | PO Box 8061,<br>Mt Gambier West, SA, 5291 | **Sampling Date:** | 20/05/2024 |
| **Client:** | Client | **Date Received:** | 27/05/2024 |
| **Test Set or Quotation:** | SP1 | **Sample Name:** | 3t/ha |
| **Barcode:** | 111506985 | **Crop:** | Ryegrass |
| **Batch Number:** | 38479 | **Sample Depth:** | 0-10 |
| **Submission ID:** | 122913 | **GPS Start:** | NA |
| | | **GPS End:** | NA |

| | Analyte | Unit | Desired Level | Level Found | c.mol/kg |
|---|---|---|---|---|---|
| | MIR - Aus Soil Texture | | | Silty loam | |
| | ECEC | cmol/kg | 5.00-25.0 | 9.03 | |
| | Organic Carbon (W&B) [2] | % (40°C) | 0.90-1.80 | 3.95 | |
| | pH 1:5 water | pH units | 6.50-7.50 | 6.01 | |
| | pH CaCl2 (following 4A1) | pH units | 5.50-6.50 | 5.40 | |
| Extractable N-P-K-S | Nitrate - N (2M KCl) | mg/kg | 20-50 | 11 | |
| | Ammonium - N (2M KCl) | mg/kg | 2.0-10 | 1.2 | |
| | Olsen Phosphorus | mg/kg | 15-25 | 15 | |
| | Colwell Phosphorus | mg/kg | 33-46 | 49 | |
| | PBI + Col P | | 35-70 | 111 | |
| | Colwell Potassium | mg/kg | 150-220 | 96 | |
| | KCl Sulfur (S) | mg/kg | 8.0-20 | 10 | |
| Exchangeable cations | Calcium (Ca) - AmmAc | mg/kg | 1000-2000 | 1390 | 6.96 |
| | Magnesium (Mg) - AmmAc | mg/kg | 150-200 | 189 | 1.55 |
| | Potassium (K) - AmmAc | mg/kg | 150-220 | 78 | 0.199 |
| | Sodium (Na) - AmmAc | mg/kg | 15.0-120 | 73.2 | 0.318 |
| | Exchangeable aluminium | cmol/kg | 0.10-0.35 | <0.02 | |
| | Exchangeable hydrogen | cmol/kg | 0.10-0.35 | <0.02 | |
| Trace Elements | Boron | mg/kg | 0.50-2.0 | 0.64 | |
| | Iron (Fe) | mg/kg | 10-70 | 340 | |
| | Manganese (Mn) | mg/kg | 1.0-10 | 4.1 | |
| | Copper (Cu) | mg/kg | 0.50-1.0 | 0.29 | |
| | Zinc (Zn) | mg/kg | 0.50-1.0 | 0.86 | |
| Salt | Salinity EC 1:5 | dS/m | 0.025-0.15 | 0.11 | |
| | Ece | dS/m | 0.10-1.5 | 1.00 | |
| Physical | MIR - Clay | % | | 11.8 | |
| | MIR - Sand (+20 micron) | % | | 54.8 | |
| | MIR - Silt (2-20 micron) | % | | 33.4 | |
| Ratios | Ca:Mg Ratio | | 2.0-8.0 | 4.5 | |
| | K:Mg Ratio | | 0.10-0.50 | 0.13 | |
| | GTRI | | 0.02-0.07 | 0.02 | |

| | | Unit | Desired Level | Level Found |
|---|---|---|---|---|
| Exch. cation % | Calcium | % | 60.0-80.0 | 77.1 |
| | Magnesium | % | 10.0-20.0 | 17.2 |
| | Potassium | % | 3.0-8.0 | 2.2 |
| | Sodium | % | 0.5-6.0 | 3.5 |
| | Aluminium | % | 0.5-10 | 0.0 |
| | Hydrogen | % | 0.3-5.0 | 0.0 |



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# SOIL ANALYSIS

| | | | |
|---|---|---|---|
| **Agent:** | Van Schaiks Biogro | **Report Date:** | 03/06/2024 |
| **Agent Address:** | PO Box 8061,<br>Mt Gambier West, SA, 5291 | **Sampling Date:** | 20/05/2024 |
| | | **Date Received:** | 27/05/2024 |
| **Client:** | Client | **Sample Name:** | 5t/ha |
| **Test Set or Quotation:** | SP1 | **Crop:** | Ryegrass |
| **Barcode:** | 111506986 | **Sample Depth:** | 0-10 |
| **Batch Number:** | 38479 | **GPS Start:** | NA |
| **Submission ID:** | 122913 | **GPS End:** | NA |

| | Analyte | Unit | Desired Level | Level Found | c.mol/kg |
|---|---|---|---|---|---|
| | MIR - Aus Soil Texture | | | Silty loam | |
| | ECEC | cmol/kg | 5.00-25.0 | 9.80 | |
| | Organic Carbon (W&B) [2] | % (40°C) | 0.90-1.80 | 4.46 | |
| | pH 1:5 water | pH units | 6.50-7.50 | 6.13 | |
| | pH CaCl2 (following 4A1) | pH units | 5.50-6.50 | 5.56 | |
| Extractable N-P-K-S | Nitrate - N (2M KCl) | mg/kg | 20-50 | 13 | |
| | Ammonium - N (2M KCl) | mg/kg | 2.0-10 | 1.3 | |
| | Olsen Phosphorus | mg/kg | 15-25 | 14 | |
| | Colwell Phosphorus | mg/kg | 33-46 | 49 | |
| | PBI + Col P | | 35-70 | 112 | |
| | Colwell Potassium | mg/kg | 150-220 | 130 | |
| | KCl Sulfur (S) | mg/kg | 8.0-20 | 12 | |
| Exchangeable cations | Calcium (Ca) - AmmAc | mg/kg | 1000-2000 | 1520 | 7.58 |
| | Magnesium (Mg) - AmmAc | mg/kg | 150-200 | 197 | 1.62 |
| | Potassium (K) - AmmAc | mg/kg | 150-220 | 108 | 0.276 |
| | Sodium (Na) - AmmAc | mg/kg | 15.0-120 | 75.3 | 0.328 |
| | Exchangeable aluminium | cmol/kg | 0.10-0.35 | <0.02 | |
| | Exchangeable hydrogen | cmol/kg | 0.10-0.35 | <0.02 | |
| Trace Elements | Boron | mg/kg | 0.50-2.0 | 0.72 | |
| | Iron (Fe) | mg/kg | 10-70 | 340 | |
| | Manganese (Mn) | mg/kg | 1.0-10 | 5.6 | |
| | Copper (Cu) | mg/kg | 0.50-1.0 | 0.37 | |
| | Zinc (Zn) | mg/kg | 0.50-1.0 | 1.2 | |
| Salt | Salinity EC 1:5 | dS/m | 0.025-0.15 | 0.12 | |
| | Ece | dS/m | 0.10-1.5 | 1.1 | |
| Physical | MIR - Clay | % | | 11.9 | |
| | MIR - Sand (+20 micron) | % | | 56.7 | |
| | MIR - Silt (2-20 micron) | % | | 31.3 | |
| Ratios | Ca:Mg Ratio | | 2.0-8.0 | 4.7 | |
| | K:Mg Ratio | | 0.10-0.50 | 0.17 | |
| | GTRI | | 0.02-0.07 | 0.03 | |

| | | Unit | Desired Level | Level Found |
|---|---|---|---|---|
| Exch. cation % | Calcium | % | 60.0-80.0 | 77.3 |
| | Magnesium | % | 10.0-20.0 | 16.5 |
| | Potassium | % | 3.0-8.0 | 2.8 |
| | Sodium | % | 0.5-6.0 | 3.3 |
| | Aluminium | % | 0.5-10 | 0.0 |
| | Hydrogen | % | 0.3-5.0 | 0.0 |



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# SOIL ANALYSIS

| | | | |
|---|---|---|---|
| **Agent:** | Van Schaiks Biogro | **Report Date:** | 03/06/2024 |
| **Agent Address:** | PO Box 8061,<br>Mt Gambier West, SA, 5291 | **Sampling Date:** | 20/05/2024 |
| **Client:** | Client | **Date Received:** | 27/05/2024 |
| **Test Set or Quotation:** | SP1 | **Sample Name:** | 10t/ha |
| **Barcode:** | 111506987 | **Crop:** | Ryegrass |
| **Batch Number:** | 38479 | **Sample Depth:** | 0-10 |
| **Submission ID:** | 122913 | **GPS Start:** | NA |
| | | **GPS End:** | NA |

| | Analyte | Unit | Desired Level | Level Found | c.mol/kg |
|---|---|---|---|---|---|
| | MIR - Aus Soil Texture | | | Silty loam | |
| | ECEC | cmol/kg | 5.00-25.0 | 13.4 | |
| | Organic Carbon (W&B) [2] | % (40°C) | 0.90-1.80 | 4.18 | |
| | pH 1:5 water | pH units | 6.50-7.50 | 6.54 | |
| | pH CaCl2 (following 4A1) | pH units | 5.50-6.50 | 6.11 | |
| Extractable N-P-K-S | Nitrate - N (2M KCl) | mg/kg | 20-50 | 18 | |
| | Ammonium - N (2M KCl) | mg/kg | 2.0-10 | 1.5 | |
| | Olsen Phosphorus | mg/kg | 15-25 | 22 | |
| | Colwell Phosphorus | mg/kg | 33-46 | 72 | |
| | PBI + Col P | | 35-70 | 127 | |
| | Colwell Potassium | mg/kg | 150-220 | 210 | |
| | KCl Sulfur (S) | mg/kg | 8.0-20 | 16 | |
| Exchangeable cations | Calcium (Ca) - AmmAc | mg/kg | 1000-2000 | 2110 | 10.5 |
| | Magnesium (Mg) - AmmAc | mg/kg | 150-200 | 237 | 1.95 |
| | Potassium (K) - AmmAc | mg/kg | 150-220 | 180 | 0.461 |
| | Sodium (Na) - AmmAc | mg/kg | 15.0-120 | 94.5 | 0.411 |
| | Exchangeable aluminium | cmol/kg | 0.10-0.35 | <0.02 | |
| | Exchangeable hydrogen | cmol/kg | 0.10-0.35 | <0.02 | |
| Trace Elements | Boron | mg/kg | 0.50-2.0 | 0.70 | |
| | Iron (Fe) | mg/kg | 10-70 | 280 | |
| | Manganese (Mn) | mg/kg | 1.0-10 | 6.7 | |
| | Copper (Cu) | mg/kg | 0.50-1.0 | 0.35 | |
| | Zinc (Zn) | mg/kg | 0.50-1.0 | 1.5 | |
| Salt | Salinity EC 1:5 | dS/m | 0.025-0.15 | 0.19 | |
| | Ece | dS/m | 0.10-1.5 | 1.8 | |
| Physical | MIR - Clay | % | | 12.6 | |
| | MIR - Sand (+20 micron) | % | | 55.4 | |
| | MIR - Silt (2-20 micron) | % | | 32.0 | |
| Ratios | Ca:Mg Ratio | | 2.0-8.0 | 5.4 | |
| | K:Mg Ratio | | 0.10-0.50 | 0.24 | |
| | GTRI | | 0.02-0.07 | 0.04 | |

| | | Unit | Desired Level | Level Found |
|---|---|---|---|---|
| Exch. cation % | Calcium | % | 60.0-80.0 | 78.9 |
| | Magnesium | % | 10.0-20.0 | 14.6 |
| | Potassium | % | 3.0-8.0 | 3.5 |
| | Sodium | % | 0.5-6.0 | 3.1 |
| | Aluminium | % | 0.5-10 | 0.0 |
| | Hydrogen | % | 0.3-5.0 | 0.0 |



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# SOIL ANALYSIS

| | | | |
|---|---|---|---|
| **Agent:** | Van Schaiks Biogro | **Report Date:** | 03/06/2024 |
| **Agent Address:** | PO Box 8061,<br>Mt Gambier West, SA, 5291 | **Sampling Date:** | 20/05/2024 |
| **Client:** | Client | **Date Received:** | 27/05/2024 |
| **Test Set or Quotation:** | SP1 | **Sample Name:** | 15t/ha |
| **Barcode:** | 111506988 | **Crop:** | Ryegrass |
| **Batch Number:** | 38479 | **Sample Depth:** | 0-10 |
| **Submission ID:** | 122913 | **GPS Start:** | NA |
| | | **GPS End:** | NA |

| | Analyte | Unit | Desired Level | Level Found | c.mol/kg |
|---|---|---|---|---|---|
| | MIR - Aus Soil Texture | | | Silty loam | |
| | ECEC | cmol/kg | 5.00-25.0 | 15.0 | |
| | Organic Carbon (W&B) [2] | % (40°C) | 0.90-1.80 | 4.18 | |
| | pH 1:5 water | pH units | 6.50-7.50 | 6.65 | |
| | pH CaCl2 (following 4A1) | pH units | 5.50-6.50 | 6.31 | |
| Extractable N-P-K-S | Nitrate - N (2M KCl) | mg/kg | 20-50 | 45 | |
| | Ammonium - N (2M KCl) | mg/kg | 2.0-10 | 2.3 | |
| | Olsen Phosphorus | mg/kg | 15-25 | 36 | |
| | Colwell Phosphorus | mg/kg | 33-46 | 120 | |
| | PBI + Col P | | 35-70 | 115 | |
| | Colwell Potassium | mg/kg | 150-220 | 400 | |
| | KCl Sulfur (S) | mg/kg | 8.0-20 | 18 | |
| Exchangeable cations | Calcium (Ca) - AmmAc | mg/kg | 1000-2000 | 2300 | 11.5 |
| | Magnesium (Mg) - AmmAc | mg/kg | 150-200 | 279 | 2.29 |
| | Potassium (K) - AmmAc | mg/kg | 150-220 | 334 | 0.853 |
| | Sodium (Na) - AmmAc | mg/kg | 15.0-120 | 86.7 | 0.377 |
| | Exchangeable aluminium | cmol/kg | 0.10-0.35 | <0.02 | |
| | Exchangeable hydrogen | cmol/kg | 0.10-0.35 | <0.02 | |
| Trace Elements | Boron | mg/kg | 0.50-2.0 | 0.83 | |
| | Iron (Fe) | mg/kg | 10-70 | 230 | |
| | Manganese (Mn) | mg/kg | 1.0-10 | 7.5 | |
| | Copper (Cu) | mg/kg | 0.50-1.0 | 0.51 | |
| | Zinc (Zn) | mg/kg | 0.50-1.0 | 2.3 | |
| Salt | Salinity EC 1:5 | dS/m | 0.025-0.15 | 0.24 | |
| | Ece | dS/m | 0.10-1.5 | 2.3 | |
| Physical | MIR - Clay | % | | 12.9 | |
| | MIR - Sand (+20 micron) | % | | 55.2 | |
| | MIR - Silt (2-20 micron) | % | | 31.9 | |
| Ratios | Ca:Mg Ratio | | 2.0-8.0 | 5.0 | |
| | K:Mg Ratio | | 0.10-0.50 | 0.37 | |
| | GTRI | | 0.02-0.07 | 0.06 | |

| | | Unit | Desired Level | Level Found |
|---|---|---|---|---|
| Exch. cation % | Calcium | % | 60.0-80.0 | 76.5 |
| | Magnesium | % | 10.0-20.0 | 15.3 |
| | Potassium | % | 3.0-8.0 | 5.7 |
| | Sodium | % | 0.5-6.0 | 2.5 |
| | Aluminium | % | 0.5-10 | 0.0 |
| | Hydrogen | % | 0.3-5.0 | 0.0 |


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# SOIL ANALYSIS

| | | | |
|---|---|---|---|
| **Agent:** | Van Schaiks Biogro | **Report Date:** | 03/06/2024 |
| **Agent Address:** | PO Box 8061,<br>Mt Gambier West, SA, 5291 | **Sampling Date:** | 20/05/2024 |
| **Client:** | Client | **Date Received:** | 27/05/2024 |
| **Test Set or Quotation:** | SP1 | **Sample Name:** | Control |
| **Barcode:** | 111506989 | **Crop:** | Ryegrass |
| **Batch Number:** | 38479 | **Sample Depth:** | 0-10 |
| **Submission ID:** | 122913 | **GPS Start:** | NA |
| | | **GPS End:** | NA |

| | Analyte | Unit | Desired Level | Level Found | c.mol/kg | Very Low / Low / Acceptable / High / Excessive |
|---|---|---|---|---|---|---|
| | MIR - Aus Soil Texture | | | Silty loam | | |
| | ECEC | cmol/kg | 5.00-25.0 | 9.67 | | |
| | Organic Carbon (W&B) [2] | % (40°C) | 0.90-1.80 | 3.93 | | |
| | pH 1:5 water | pH units | 6.50-7.50 | 6.24 | | |
| | pH CaCl2 (following 4A1) | pH units | 5.50-6.50 | 5.55 | | |
| Extractable N-P-K-S | Nitrate - N (2M KCl) | mg/kg | 20-50 | 10 | | |
| | Ammonium - N (2M KCl) | mg/kg | 2.0-10 | 1.5 | | |
| | Olsen Phosphorus | mg/kg | 15-25 | 12 | | |
| | Colwell Phosphorus | mg/kg | 33-46 | 45 | | |
| | PBI + Col P | | 35-70 | 109 | | |
| | Colwell Potassium | mg/kg | 150-220 | 120 | | |
| | KCl Sulfur (S) | mg/kg | 8.0-20 | 11 | | |
| Exchangeable cations | Calcium (Ca) - AmmAc | mg/kg | 1000-2000 | 1520 | 7.59 | |
| | Magnesium (Mg) - AmmAc | mg/kg | 150-200 | 178 | 1.46 | |
| | Potassium (K) - AmmAc | mg/kg | 150-220 | 92 | 0.236 | |
| | Sodium (Na) - AmmAc | mg/kg | 15.0-120 | 86.5 | 0.376 | |
| | Exchangeable aluminium | cmol/kg | 0.10-0.35 | <0.02 | | |
| | Exchangeable hydrogen | cmol/kg | 0.10-0.35 | <0.02 | | |
| Trace Elements | Boron | mg/kg | 0.50-2.0 | 0.63 | | |
| | Iron (Fe) | mg/kg | 10-70 | 320 | | |
| | Manganese (Mn) | mg/kg | 1.0-10 | 4.2 | | |
| | Copper (Cu) | mg/kg | 0.50-1.0 | 0.30 | | |
| | Zinc (Zn) | mg/kg | 0.50-1.0 | 0.77 | | |
| Salt | Salinity EC 1:5 | dS/m | 0.025-0.15 | 0.11 | | |
| | Ece | dS/m | 0.10-1.5 | 1.1 | | |
| Physical | MIR - Clay | % | | 11.9 | | |
| | MIR - Sand (+20 micron) | % | | 55.8 | | |
| | MIR - Silt (2-20 micron) | % | | 32.3 | | |
| Ratios | Ca:Mg Ratio | | 2.0-8.0 | 5.2 | | |
| | K:Mg Ratio | | 0.10-0.50 | 0.16 | | |
| | GTRI | | 0.02-0.07 | 0.03 | | |

| | | Unit | Desired Level | Level Found |
|---|---|---|---|---|
| Exch. cation % | Calcium | % | 60.0-80.0 | 78.5 |
| | Magnesium | % | 10.0-20.0 | 15.1 |
| | Potassium | % | 3.0-8.0 | 2.4 |
| | Sodium | % | 0.5-6.0 | 3.9 |
| | Aluminium | % | 0.5-10 | 0.0 |
| | Hydrogen | % | 0.3-5.0 | 0.0 |


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