

VERMICOMPOST & EXTRACTS

GRANITE BELT, QUEENSLAND

What is vermicomposting?

Vermicomposting is the process of using worms (usually compost worms) to assist in composting organic matter, to create vermicast. This end product (a rich, soil-like substance), can improve soil health and fertility, increase the nutrient content and microbial life of soils, improve water retention, and reduce the need for fertilisers and pesticides (the extent depends on your local conditions).

Microbes

Vermicomposting enhances the presence of beneficial microbes. An Indian study (bit.ly/vermigold) found microbial activity in worm castings could be up to 20 times higher than that of soil or other organic matter.

Water holding capacity

When viewed under the microscope, the sponge like structure of vermicast can be observed; this has two important benefits. Firstly, it is highly porous, allowing gases and liquids to move with little resistance. Secondly, castings can hold two to three times more water than their weight in soil (bit.ly/vermigold). This increases the water holding capacity of the soil and minimises the leaching of nutrients below the rooting zone.

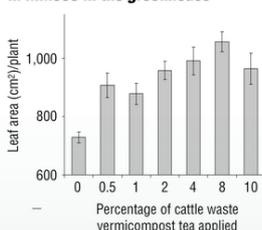
Potential yield increases

A French meta analysis of vermicomposting outcomes globally found average increases of 26% in commercial yields, 13% in total biomass, 78% in shoot biomass, and 57% in root biomass (bit.ly/vermigrowth). The positive effect of vermicompost on plant growth reached a maximum when vermicompost represented 30-50% of the soil volume, the researchers found. In the sandier soil found in Queensland's Granite Belt, the SQNNSW Innovation Hub is working with local commercial growers to support the integration and adoption of vermicomposting technologies.

Plant growth

Various studies have found vermicompost and teas produced from vermicompost, can positively impact plant growth (bit.ly/vermitea and bit.ly/vermi101).

Figure 3. Growth of tomatoes measured in terms of leaf area in response to regular vermicompost tea applications to plants growing in MM360 in the greenhouse



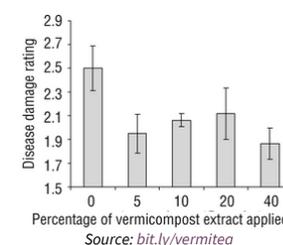
Nutrients & disease suppression

Vermicast also makes two important nutrients more available to plants: nitrate and calcium. An Indian study (bit.ly/vermigold) found worm castings can contain up to five times the available nitrogen and 1.5 times the available calcium than generally available in “good top soil”.

In carrots, a Hort Innovation factsheet (bit.ly/pythiumcarrot) notes increasing the level of exchangeable calcium in soil decreased the incidence of cavity spot. According to the Hort Innovation factsheet, calcium is known to suppress diseases by the following mechanisms: it is involved with recognition and early defence by the plant; it inhibits the pathogen from secreting plant cell degrading enzymes; and it inhibits sporangial germination in *Pythium* species.

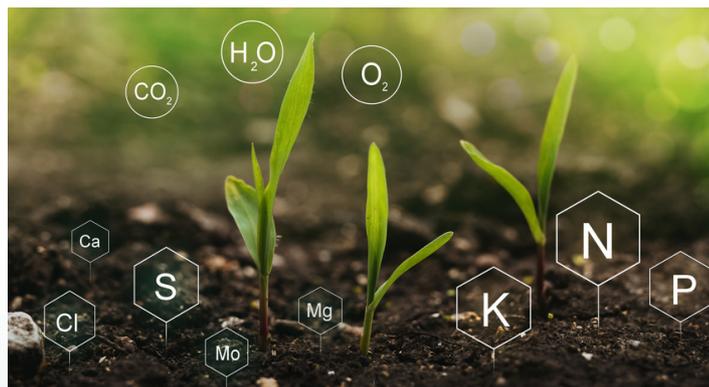
There is some evidence vermicompost can suppress a range of plant diseases, including *Pythium* on radishes, *Rhizoctonia* on cucumbers, *Verticillium* wilt in strawberries, and *Phomopsis* and powdery mildew on grapes, according to researchers in the US (bit.ly/vermitea).

Figure 4. Suppression of Verticillium in tomato plants by the application of cattle waste vermicompost teas to the foliage



More information

- Interested in taking the next step – contact Wim Linstrom - 07 4685 5005, wim.linstrom@usq.edu.au
- Brock Macdonald – Growcom Resilience Officer, 0418 893 442, wmcdonald@growcom.com.au (extensive experience with vermicomposting)
- Andrew Woodford – Wilshire & Co Agronomist - 0447 145 159, andrew.woodford@wilshireandco.com.au
- Worms Downunder – wormsdownunder.com.au



Learn more about vermiculture

YouTube



The SQNSW Innovation Hub has curated a playlist from Australia and across the world, covering everything from the science of vermiculture, large scale production, and the brewing of vermicast extracts. bit.ly/vermiYT

Articles

The basics of vermicomposting – a basic overview, from Oklahoma State University. bit.ly/3W32r4L

Vermicomposting – an extensive overview of vermicomposting from a US-based operator. bit.ly/3CDFaji

Compost tea – the brewing process. bit.ly/3QFmOEK

Effects of vermicompost teas on plant growth and disease – from Ohio State University researchers for BioCycle magazine. bit.ly/vermitea

Vermicast 101: good for soil and plants – an excerpt from *The Worm Farmer's Handbook*. bit.ly/vermi101

Books

Earthworms in Australia – a small book packed with information on worms and worm farming from author David Murphy. bit.ly/3CJ2BHP

Worms Eat My Garbage – 35th Anniversary Edition: how to set up and maintain a worm composting system by Mary Appelhof, Joanne Olszewski, & Amy Stewart. bit.ly/3vTVwAm

The Worm Farmer's Handbook – Mid to large-scale vermicomposting for farms, businesses, municipalities, schools, and institutions by Rhonda Sherman. bit.ly/3XqIIDM

Blogs & podcasts

Worms Downunder – a range of posts on vermicomposting and related topics. wormsdownunder.com.au/blog/

Graeme Sait – links to articles and podcasts by Graham on nutrition farming including vermicomposting and use of extracts. blog.nutri-tech.com.au

For the scientifically minded

Sustainable management of diseases and pests in crops by vermicompost and vermicompost tea – 2021. bit.ly/3QvGSJ7

A review of vermiculture technologies for environmental management and resource development – 2010. bit.ly/3vWOxqk

Effects of vermicompost on plant growth and soil structure – 2018. bit.ly/3GzlyxN

Vermicompost, the story of organic gold: A review – 2012. bit.ly/vermigold

Vermicompost significantly affects plant growth. A meta-analysis – 2019. bit.ly/vermigrowth

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