Worm Power for Sustainable Community Farming

Proudly supported by the Queensland Government—Engaging Science Grants

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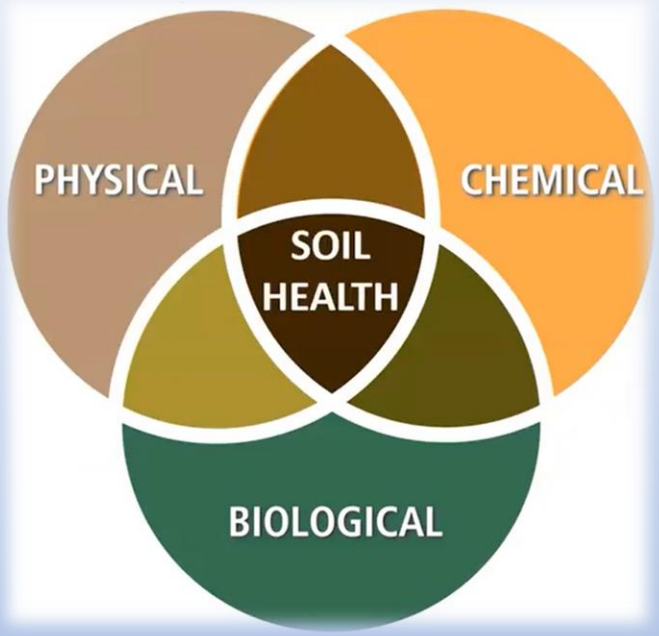
Healthy Soil Equals Healthy Plants

Soil porosity
Water infiltration



pH
Chemical elements

Diversity of soil organisms (earthworms, mites, nematodes, protozoa, fungi, actinomycetes, bacteria)

Benefits of diversity: ecosystem stability and resilience

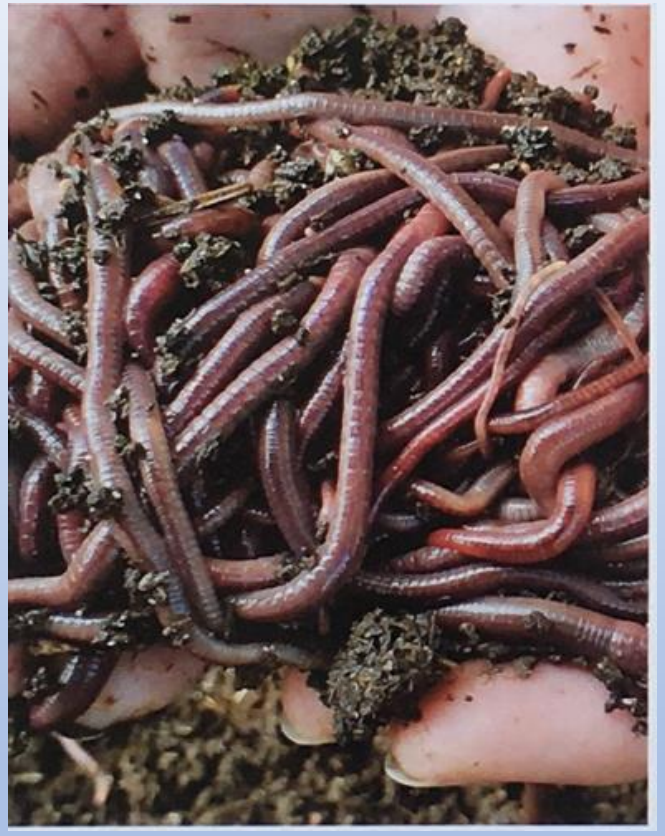
The lack of worms in the soil is an indication of a soil lacking fertilely and health (Charles Darwin).

Background of vermicompost

* VermiComposting is a process by which the bioconversion of organic waste into a fertiliser due to earthworms' gut activity.

* Earthworms have indigenous microflora in gut that contributes to microbial community in castings.

* High concentration of organic matter, beneficial microorganisms, nutrients, hormones, and enzymes



Worm and microbes

Organic material ⟶ Organic matter (vermicast)

Why vermicompost?

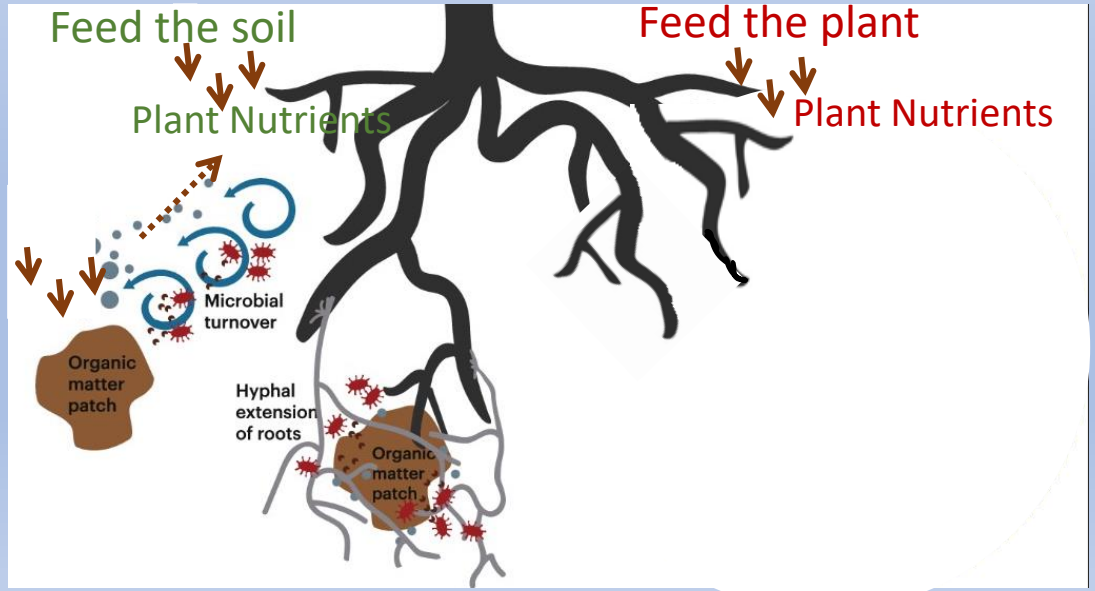
* Provide long term soil fertility ➔ better plant health + better yield

* Improve soil structure ➔ better use of water and nutrients (decrease environment harm), easier for root to grow

* Contain beneficial microorganisms ➔ disease and pest suppression, phytohormones production, nutrient cycling

Organic Fertiliser

Chemical Fertiliser



Vermicompost uses: worm castings

* A few table spoons around each plant
* Supplemental fertiliser with other chemical fertilisers or compost
* Mix with other substrates (such as peat and perlite) to generate potting mix

* Make worm tea as a liquid fertiliser:

** 1-2 tablespoons of castings to 1 litre of water let stand for overnight, stir a few times. Dilute this concentrate in a 5 litres of water to irrigate the plants.

** 2 cup of castings to 20 litres of water and 1/3 cup molasse, aerate for 24-36 hr.

Gympie and District Landcare Group's vermicompost

	Castings	Liquid (leachate)
pH	7.07	7.8
Microbial biomass	533 (µg/g soil)	11.3 (µg/ml liquid)
N:P:K (%)	2.64:0.2:1.06	n/a:0.002:0.08
C:N	11:1	n/a
NO3-N (ppm)	846	161
Other vermicast (manure as feedstocks)		
N:P:K (%)	1.67:3.04:0.55	n/a
C:N	14:1	n/a
NO3-N (ppm)	1988	n/a

Gympie and District Landcare Group's vermicompost

Castings

Liquid (leachate)

Genus identification (*Family)	Relative abundance (%)	Genus identification	Relative abundance (%)
Streptomyces	4.8	Rummeliibacillus	8.1
Bacillus	3.7	Reyranella	4.6
Amaricoccus	3.5	Rhizobiales Incertae Sedis	4
Clostridium sensu stricto	3.0	Devosia	3.8
Gemmatimonadaceae*	3.0	Algoriphagus	2.7
Promicromonosporaceae*	2.6	Bauldia	2.6
Microscillaceae	2.1	Pseudorhodoplanes	2.4
Nitrosomonadaceae	1.9	Nitrospira	1.8
Bauldia	1.5	Clostridium sensu stricto 1	1.8
Nocardioides	1.5	Legionella	1.7

Plant trial: vermicompost products *vs* chemical fertiliser

Treatments	Chemical (%N)	Worm casting (%N)	Worm leachates (%N)
1	0	0	0
2	100	0	0
3	0	100	0
4	0	0	100
5	**75**	**25**	**0**
6	**50**	**50**	**0**
7	**25**	**75**	**0**
8	75	0	25
9	50	0	50
10	25	0	75

Plant trial: vermicompost products *vs* chemical fertiliser