



# MYNOKE<sup>®</sup>

The Vermicast Newsletter  
March 2015 • Issue 1

## NEWS



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## World's largest worm farm in South Waikato

MyNOKE can claim to having the world's largest wormfarm. Operating on four central North Island locations with a total area of more than 60 ha more than 150,000 tonnes of organic resources are diverted from landfills and "upcycled" into more than 30,000 tonnes of the most valuable fertiliser and soil conditioner, worldwide known as vermicast or vermicompost. The largest vermicomposting operation is located at Kinleith near Tokoroa, South Waikato, with a capacity of vermicomposting 114,000 tonnes of organic wastes per year. More MyNOKE worm farms are operated in Taupo, and Maketu. A new industrial scale vermicomposting operation is planned for this year in Putaruru.

Dr. agr. Michael Quintern has a PhD in soil sciences and 25 years of experience in soil management and utilisation of organic resources to farm land. He developed industrial scale 'wormfarming' when working as a soil scientist at a New Zealand Crown Research Institute.

"Soils in the central North Island have not reached their full production capacity yet. Young soils, and especially those converted from pine forest, are lacking of organic matter and earthworms. Both are the key for deep rooting pasture and crops."

Seeing the demand for high quality humus rich fertilisers and soil conditioners Michael took a bottom-up approach. The key was to give farmers and orchard managers access to a locally produced and low-cost product that can easily combined with mineral fertiliser to balance the nutrient demand for soils and crops.

Every farmer and gardener knows the potential of earthworms of converting manure and plant residues into high quality humus. But are earthworms able to process 250,000 tonnes of the region's organic wastes? Michael took techniques from medium size wormfarms and applied New Zealand's highly effective farm management practices. His technology is absolutely unique in the world. To make sure everyone



**PASSION: Earthworms are high-tech humus producer for Dr. agr. Michael Quintern at MyNOKE**

knows its developed in New Zealand we branded it MyNOKE related from the Maori word for earthworms, "noke".

The produced pure MyNOKE earthworm casting is of higher quality than most of the general produced composts. The production costs

are even lower as the earthworms are doing all the hard work such as turning the product. As a result MyNOKE can offer the vermicast to farmers at a very compatible price. Locally produced in the central North Island transportation costs are low too. ■



## MYNOKE VERMICAST

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# What is Vermicast?

Earthworms are feeding on organic matter such as leaves, manure, dead roots, soil humus, bacteria, fungi and other microorganism in and on top of the soil. Together with the organic matter they take up soil particles. In the earthworm's gizzard the soil particles serve like mill-stones and grind down the organic matter while probably killing some bad bugs as well. Further down the few cm long intestine, a lot is happening to the mix even scientist can't figure out at this stage. Specific bacteria is fermenting and decomposing the organic matter, destroying bad germs, such as e. coli., salmonella, but also spores of the facial eczema fungi. Then it introduces beneficial bacteria which help fix nitrogen in soils and make phosphorus available to plants. Organic matter is transformed to humus and humic acids with very effective and earthworm specific plant growth stimulators such as gibberellin and auxin, which stimulates root growth and flowering. Nutrients in the organic become plant available and the carbon to nitrogen ratio becomes narrow, which indicates high quality humus that can hold and exchange a lot of plant nutrients in the soil. Clay minerals swallowed by the worm are coated with humus and

the same humus acts like an adhesive to sand particles and creates stable micro soil / humus aggregates. At the end, towards the worm's tail, the mix is pelletised and coated with a mucus before released as vermicast. The coat makes sure that nutrients are not washed out immediately and helps to build a natural porous soil structure.

MyNOKE Vermicast is pure humus rich earthworm casting and is the most effective organic fertiliser and soil conditioner. It is ideal for soils with a lack of humus. MyNOKE vermicast is rich in:

- Humus
- Humic acids
- Microbes
- Fungi
- Micorrhiza
- Bacteria
- Calcium
- Growth Promoters
- Enzymes to unlock phosphate
- Cations Exchange Capacity

With all these ingredients and goodies it is not such a surprise that already Charles Darwin (1881) described earthworms, as "It may be doubted whether there are many other animals which have played so important a part in the history of the world, as have these lowly organized creatures." ■



*MyNOKE is successfully breeding Southern Worms for improving pasture production.*

## What's the difference?

**Vermicast** is pure casting 'poo' produced by earthworms. Wet organic wastes are applied to worm farms and digested by compost worms over a period of more than 12 months in a soil mesophilic (cold) natural way. Almost all material has passed through the worms several times and transformed into soil humus like mature organic fertiliser and soil conditioner. The volume reduction through vermicomposting is up to 80%. No filler such as woodchips or sawdust are added, as earthworms can't digest these efficiently. This means no nitrogen is locked away in the soil. Vermicast is rich in bacteria, fungi, and especially in plant growth stimulators such as auxin and gibberellins.

**Compost** is mostly produced from a mix of easy compostable organic mater and a wooden bulking agent or filler such as woodchips and sawdust so oxygen can flow through the composting windrow. Most processes require regular turning to finish composting within 4 months. The process is finished when the compost does not become hot after turning. By than the volume has been reduced by 1/3 and will decompose further after application to soil. Large residues of un-composted woody structural material will require nitrogen for further decomposition in the soil.

**Humus** is the black stuff in the top soil and describes the organic component of soils, formed by the decomposition of organic matter, such as leaves, roots, manure, etc. Humus is important to soil fertility and productivity in chemical, biological, and physical manners. Chemically it is holding and exchanging plant nutrients, releasing plant growth regulators, buffering the soil pH and much more. Biologically it hoists and provides food to microorganism and plants. Humus creates stable soil aggregates and therefore is important to many physical functions of the soils such as water holding capacity, aeration, aggregate stability, erosion resistance, and much more.

**Humic acid** is a general term for a fraction of organic matter that can be dissolved in alkaline solutions. Humic acids can be extracted from soil humus, vermicast, compost, lignite (humates), coal, peat, bark, and much more. Humic acids are an important component of the soil humus fraction and can influence soil microbiological and plant growth positively. It is important to plant growth which specific humic acid is contained in the organic matter and how it is generated. That is probably the reason why you find so much more scientific papers on beneficial humic acids from vermicast than from any other humus product. ■

## Things to think about

1. Humus has three times the nutrient holding capacity of clay. Only Humus and clay are holding nutrients in the soils. You can't change the clay content, but you can increase the humus content of soils.
2. A few mm of compost does not increase the topsoil much. Promoting root growth using vermicast can double the topsoil in a few years.
3. Deep root systems + high humus content = less nutrient leaching = less fertiliser losses.
4. Vermicast application in nutrient sensitive catchments can reduce nitrate losses. Better plant and root growth increases nitrogen uptake.
5. If you have purchased compost with a lot of partly decomposed filler, you have paid too much money for the small amount of humus it may content.

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# Application 101 of MyNOKE Vermicast

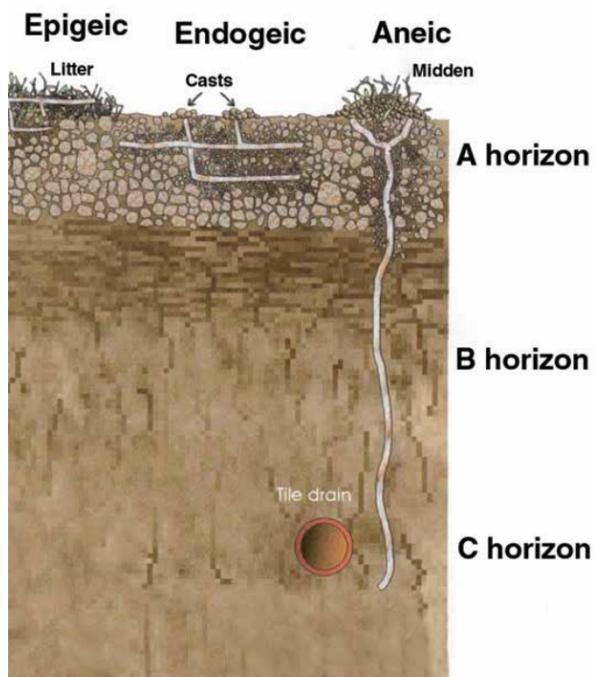
Vermicast has become available to New Zealand Farmers year round and in bulk, for the first time ever as a commercial cost effective fertiliser and soil conditioner. To understand how to use vermicast best on your farm and orchard it helps to look at what vermicast actually is, when and where it is produced, and how it is 'applied' in nature.

MyNOKE vermicast is pure casting 'poo' produced by earthworms. In fertile soils three types of earthworm species live beside each other in slightly different soil depths. All of these types should be present in pasture systems and orchards. Some live at the soil surface and are called epigeic (Greek: epi = top, geic = earth) worms e.g. dung worms. These worms make sure surface litter and dung is decomposed and turned into rich humus as castings. Endogeic (Greek: edon = within, geic = earth) worms live in the top soil where most of the roots are growing and burrow horizontally while leaving their castings near the surface. The deep dwelling earthworms are in the group of anecic (Greek: out of the earth) worms. They live in permanent holes and come out of the soil for feeding and to leave their castings at the soil surface.

All earthworm species leave their castings at the surface and they are usually active throughout the year, unless the soil becomes too dry or cold (frost). So nature is applying 'vermicast' throughout the year near the surface. It means two things:

1. Spreading of vermicast can be done any time when soils are not too wet to avoiding soil structure damage. Vermicast can even be applied before heavy rain events. So nutrients are well preserved in the casting.
2. Vermicast should be applied near to the surface. This means not buried into the soil by deep ploughing or similar soil tillage processes. Ideally vermicast is applied as dressing or just before planting crops or sowing grass.

Imagine vermicast as small humus pellets, spiked with enzymes and bacteria, and surrounded with a protective coating made from mucus by the earthworms. These pellets become active when the soil is moist and warm exactly when plants are growing and have the greatest demand for nutrients. During cold and dry periods these casting pellets remain in-active and all goodies are well preserved. ■



Types of earthworms in soils and where vermicast is deposited.

## Inoculating soils with earthworms

Pasture earthworms, and those living in orchards and garden soils, arrived in New Zealand with the first European settlers. The earthworm distribution in New Zealand is still very patchy; large areas are without earthworms. All soils converted from pine tree plantation are actually earthworm free because of the low pH of these soils and the lack of digestible organic matter.

Leading soil and agricultural scientists (Stockdill, S.M.J.) have measured

much higher yields in paddocks with introduced earthworms. "... in New Zealand ... many pastures could benefit from the introduction of earthworms." (Schon, N. AgResearch). Grass grub populations measured much lower in pastures established with earthworm populations compared to those without earthworms.

Michael Quintern, Dr. agr. soil scientist and founder of MyNOKE is convinced that inoculating pastures

with earthworms and establishing a strong and diverse earthworm population is important to successful dairy and dry stock farming. To more and more farmers and developers inoculating pastures with earthworms has become a routine, just like destumping, contouring, fencing, putting in troughs, races and gates, and finally letting cows on the paddocks.

For 5 years MyNOKE has been breeding soil dwelling earthworms, mainly Southern Worms (*Aporrectodea trapezoides*) and other earthworm species such as dung worms, grey worms, pink worms. From the end of winter until early summer MyNOKE earthworms are gently picked up with their surrounding vermicast and delivered to dairy farmers throughout the Waikato and Bay of Plenty region. The earthworms with castings are

than carefully placed in small heaps in regular distances on the paddocks. This unique New Zealand developed technique is less labour intensive and economically. Over the next months the worms will move out of the heaps into the soil and will continue breeding and multiplying on the new paddocks.

In autumn and spring MyNOKE offers a pasture and soil audit on earthworm population. MyNOKE is able to develop individual inoculation strategies from specific farm management practices. Where possible, available on farm organic materials are incorporated into an extended earthworm-breeding program to speed up the breeding process. To find out more, interested farm managers can contact Michael directly at [earthworms@mynoke.co.nz](mailto:earthworms@mynoke.co.nz). ■

## Vermicast: a calcium fertiliser that lifts soil pH

MyNOKE Vermicast has been applied to pasture and maize crops with great success over the last years. Farmers are overwhelmed by the outstanding results during recent drought seasons. Increase in yield, much better root development, and the positive effects on plant health are surely on the main reason why farmers chose MyNOKE vermicast. With calcium content of 13%, high quality humus content of 36%, and a pH of 7.0 to 7.2 MyNOKE vermicast has a strong effect on the soil pH and the cations exchange capacity of the soil. Dr agr. Michael Quintern explains how MyNOKE vermicast affects important soil functions like cations exchange and nutrient holding capacity, availability of nutrients to plants, and soil pH.

Cations are important for plant nutrition and for soil structure. Cations like Ca, Mg, K, Na, and most trace elements are 'stored' and exchanged on the surface of humus particles and clay minerals. This is called 'cations exchange capacity' or CEC. A higher CEC of a soil can be compared with a larger battery. So more cations like calcium, potassium, magnesium, etc. can be supplied to the plants in soils with more humus. As we can't change the clay content of our soils we can only increase the CEC of our top soil by increasing the

humus content and the quality of the humus.

Beside the size of the 'battery' (total CEC) it is important how much the 'battery' is charged. This is described by the base saturation. A fully 'charged battery' has a base saturation of 100%. The higher both, the CAC and the base saturation, the more plant available nutrients can be stored in the soil and protected from leaching. High CEC and base saturation also buffer the soil pH which reduces the stress for plants and microorganism in the soil.

Vermicast is one of the best 'batteries' for soils. Rich in humus – not just organic matter – with a very high cations exchange capacity. The humus is also fully charged (100% base saturation). The additional calcium and magnesium in the vermicast assists in 'charging' the humus already in the soil. By applying 1.4 to 3 mm of vermicast (10 to 20 t/ha) the soil pH lifts by several points, the CEC increases, as does the base saturation. This is mostly important when urea based nitrogen fertilisers are applied and as well on effluent blocks. Scientist have found that a high CEC and high levels of Ca reduced the losses of ammonia through volatilisation by 66%. A big plus to help reducing the fertiliser bill. ■

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# The role of Vermicast to reduce nutrient losses

Efficient farming ecosystems rely heavily on keeping nutrients within the system. Vermicast was invented by nature some 600 million years ago. This is how long earthworms are interacting in the nutrient and humus cycle of the plant and soil ecosystem. This is why farmers and soil scientist are so eager to find earthworms in the soil. One of the things that make earthworms and their vermicast so successful is the effect on the nutrient cycle. It prevents nutrients from becoming lost by leaching, runoff, volatilisation (into the air), and becoming locked away in the soil. Here are some details scientists have found out vermicast.

Vermicast is rich in humus, and has a high cations exchange capacity. This means more nutrients like calcium, magnesium, potassium, sodium, and many trace elements are stored for plants in the vermicast.

Plant growth hormones produced by earthworms such as gibberellins and auxin are proven to trigger plants to grow more roots, root hairs, and increase the activity of roots. This affects the nutrient uptake in many ways. More roots access more nutrients. This is important for the uptake of nutrients that are less mobile in soils such as phosphate. Deeper growing roots

access nutrients that have been leached out of the top decimetres of soils such as nitrogen and potassium. Higher active roots mobilise more nutrients such as phosphate and micronutrients. Deeper roots tap into deeper stores soil water and enable pasture and crops to grow longer during drought spells and to utilise the fertiliser applied giving greater yields.

Specific bacteria in the earthworm's intestines produce an enzyme phosphatase. Phosphatase 'unlocks' phosphate in soils such as calcium- and ion-phosphates. These phosphate pools built up in the soil from phosphate fertilisers that have not been picked up by plants.

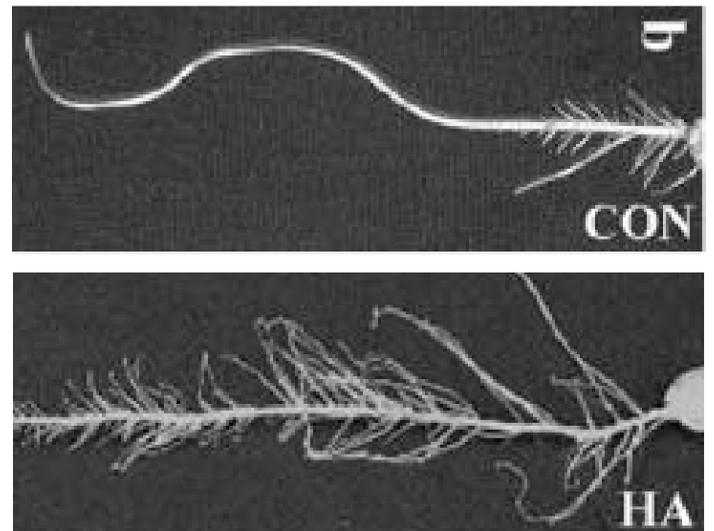
food for plants, vermicast replaces a small plate by a large bowl. Takes away the teaspoon and replaces it with a large tablespoon. Unless you are on diet you surely want a large bowl and tablespoon for dinner. And so do plants. ■

If the topsoil is the plate holding the



◀ **Maize on the right grown with 20 t/ha of MyNOKE Vermicast**

▼ **Increase root growth of maize with Vermicast (HA- bottom) and without Vermicast (CON - top)**



## MyNOKE Product Range

MyNOKE is producing a range of vermicast and high quality bark mulch. Over the last decade our science research team has developed special "recipes" of blending organic wastes for our compost worms to produce highly efficient organic fertilisers and soil conditioners. We understand that there is not one product that fits all our customers' unique demands. All our vermicast ranges are processed slowly over a 12 months period to guarantee a very mature product with the best results for your soil and crop. All vermicast is screened to 20 mm for easy and accurate spreading. See the overview of MyNOKE products and recommended applications.

MyNOKE regular vermicast is our most popular vermicast used by a large number of farmers in your region. It is darker and higher in nitrogen, phosphorus, and calcium. It has a good liming effect, boosts soil organic matter in its best form

as pure soil humus, and promotes plant and root growth. It is made from our best resources of wood fibre and nutrient rich sludge from food processing plants and communities. We recommend MyNOKE regular vermicast for cropping and recently converted land with low humus content where nutrient-holding capacity of the soil is important. Reduce your mineral fertiliser and lime demand.

MyNOKE organic certified vermicast is the preferred vermicast for orchards throughout the North Island. It is rich in fungi, micorrhyza, bacteria, and other soil microorganisms. The high humus content boosts microbiological soil activity and benefits plant and crop health. It is made from organic certified ingredients only. We recommend MyNOKE organic certified vermicast for orchards, pasture, and berry production.



MyNOKE soil dwelling earthworms are available in spring for inoculating pasture and orchard soils. We are breeding various species but mainly Southern Worms (Aporrectodea trapezoides). New Zealand's leading soil scientists recommend inoculation of pasture soils with earthworms, where earthworm populations are low, to improve overall productivity.

Application rates of vermicast will vary according to soil conditions, crop rotation, and soil management. Graeme will consult with farmers and advises in detail on application rates and times. Following general

application rates are recommended:

- 10 t/ha to pasture and kiwi orchards
- 20 t/ha to maize and cropping. ■

### Cost and supply

Vermicast is easy to spread. The price is \$41.50 +GST per ton loaded on to transport at our Kinleith Farm.

You may nominate your own transport contractor or we will organise a company convenient to your location.

### Delivery Service

- We can price;
- Supply and load only.
  - You can collect it yourself
  - Supply and freight to your property.
  - You may instruct your own carrier to collect.

### How To Order

Contact Graeme Rodley on either his phone, email address, or go to our website and fill out the form. Graeme will assist you in getting your vermicast delivered to site. We deliver but are happy to use your preferred carrier. We organise spreading too.



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