

Step by Step Guide: Creating a Worm Farm



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He Whenua Whakatipu

Worm Farm

Acknowledgement

This Step by Step guide was developed as a part of the He Whenua Whakatipu research project that is operated under contract to Te Runanga o Ngai Tahu (TRoNT).¹ TRoNT is the elected tribal authority representing the people of Ngai Tahu, a tribe of New Zealand Maori indigenous to Te Wai Pounamu (the South Island of New Zealand).² TRoNT is contracted by Otago University to conduct the HWW research project as one of the objectives within the Agricultural Research Group on Sustainability (ARGOS).³ ARGOS is an unincorporated joint venture between the Agribusiness Group Ltd, Lincoln University and the University of Otago. ARGOS has the task of exploring the environmental, social and economic sustainability of New Zealand farming systems and is funded by the Foundation of Research, Science and Technology, a New Zealand government agency.⁴

¹ <http://www.ngaitahu.iwi.nz>

² Ngai Tahu is a New Zealand Maori tribe indigenous to Te Wai Pounamu, the South Island of New Zealand.

³ <http://www.argos.org.nz>

⁴ <http://www.frst.govt.nz>

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Introduction

This step-by-step guide provides a brief outline of how to go about creating and maintaining a worm farm based on the experience gained through the He Whenua Whakatipu (HWW) research project.⁵ This worm farm is designed so that it will provide high quality vermicompost with a superior physical structure and a high organic nutrient level. This vermicompost can be used in potting mix for raising seedlings and/or as an organic fertilizer for enhancing general soil health and plant growth. It will also provide a constant source of liquid fertiliser in the form of a leachate called vermiring.

1. Key Steps to Create a Worm Farm

There are six key steps that need to be followed in building and maintaining an organic worm farm:

- ❖ Gathering Material for Making the Worm Farm
- ❖ Creating the Worm Farm Box
- ❖ Site location
- ❖ Wild Harvesting Worms
- ❖ Growing the Worms
- ❖ Harvesting the Vermicompost

2. Gathering Material for Making the Worm Farm

The first task is to gather together all the various material that is needed to construct the worm farm. This does not need to be new material as recycled material can be just as useful and a lot more cost effective.

- Base: sheets of corrugated iron 1.5m long by 90cm wide
- Lid: sheets of polycarbonate 1.5m long by 90cm wide
- Piece of aluminium 160cm long by 20cm wide
- Wood: 4 x 1.50m long by 20cm wide with a thickness of 13mm
4 x 85cm long by 20cm wide with a thickness of 13mm
1 x 85cm long by 50mm wide with a thickness of 13mm
- Metal strip bracing for corners
- Hammer and nails
- String to hold lid on
- Small bucket

3. Creating the Worm Farm Box

Building the worm farm box should be a straight forward process for even those with the most basic of home handy man skills:

- i. The pieces of wood are assembled into a rectangle and held together by nails and metal strips being hammered into the corners (Picture 1). The single piece of wood is placed between the sides of the box that is level with the top edge and placed 15cm from one of the ends of the box.
- ii. Turn the box over and place the corrugated on top and the nail it securely into place. This is then turned over so that the corrugated iron is on the bottom.
- iii. The lid can then be placed on top and nails hammered into the wood on opposite sides of the box with the string being firmly tied to two of the nails on one side.

⁵ http://www.argos.org.nz/ngaitahu_home.shtml

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- iv. The string can then be put over the lid and tied to the other side so that they can be undone to remove the lid when necessary. It may also be necessary to put a heavy weight on the lid sometimes to protect it from strong winds.



Picture 1

4. Site Location

Selecting a site for the worm farm depends on two main factors, firstly, ease of access to the worm farm; secondly, having a site that can be cleared and dug down to put in place the leachate vermirum collection system.

- i. You will need to put the worm farm in an area that will be easy to access on a regular basis, for example, for feeding new food material to the worms, watering to keep moist where necessary (worms do not like too much water) and collecting the vermirum fertiliser.
- ii. One end of the worm farm will have to be lower than the other in order to help with the collection of the vermirum leachate (Picture 1). The soil will need to be cleared and dug out in order to get a good downward lean on the worm farm box. Once this is done an aluminium strip (or other bendable metal) can be bent in half and placed at the lower end of the box in a trench specially dug for it. The trench will also angle down so that the vermirum can automatically be collected into a bucket which has been dug into a hole at one end.

5. Wild Harvesting Worms

The worm farm requires a particular type of worm that likes living in a high nutrient environment, unlike the typical garden worms which mainly prefers to live in the soil. It is possible these days to buy the right type of compost worms from some garden centers.

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However, the cheapest way to get large quantities of the right type of worms is to carry out the following procedure:

- i. You will need a crate with holes in it, sacking, newspaper, a shovel and a wheelbarrow (Picture 2).
- ii. Then collect some high nutrient food to attract the right type of worms, for example, in this case fresh organic cow manure mixed with straw (Picture 3). Try to avoid conventional animal manure as it may have been contaminated with animal drench to kill intestinal worms and this type of manure will not attract any worms into it.



Picture 2



Picture 3

- iii. Sacking is then placed on the bottom of the crate and around the sides. The cow manure is then placed inside the crate and covered with moist newspaper and sacking.
- iv. The crate is then buried into the soil up to the level of the crate (Picture 4). Be sure to keep it from drying out and water it if necessary.
- v. After about three weeks the crate should be populated with the local compost worms, ready for you to lift them out and relocate them into your new worm farm (Picture 5).



Picture 4



Picture 5

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5. Growing the Worms

Before the worms are placed into the worm farm ensure that there is a layer of hay or straw placed on the bottom first. This helps keep the bottom layer aerobic in the initial growth stage. The worms are then placed into one end of the box (Picture 1). At this stage there will be a worm population of around 400,000 to 2,000,000 individual worms.

Regularly feed them and slowly increase their territory in an incremental manner (around 10 cm at a time) until the base of the worm farm has been completely filled up from one end of the box to the other. From now on build it up in an even manner by placing the food evenly over the bed. The worm farm also needs to be kept moist, but never flooded with water.

The food these worms like best is high in nutrients and can be in the form of organic animal manure, fresh green plant material (e.g. weeds) and/or kitchen vegetable food waste. It helps to protect the worms from sunlight and keep the vermicompost material moist by keeping the bed covered, for example, with old carpet, wool blanket, curtain etc.

A common mistake made at this time is that people simply keep on feeding the worms until the bed is full up to the top. Unfortunately, this turns the bottom 20 cm of vermicast anaerobic and significantly reduces the value of the compost. In order to avoid this the whole contents of the worm farm will need to be turned over with a garden fork every so often. This should only be done when there is no food material left on the top of the worm farm. After it has been turned over with a digging fork a new layer of food can be put on top of the worm farm (Picture 6). It then needs to be covered over and left untouched for a couple of weeks.



Picture 6

After a fortnight the worms can be fed as per normal.

This whole process can be continued for around six months and by this time the worm farm should be close to the top. By this stage it will need to be cleaned out as it is ready to be harvested for the first lot of premium organic black gold.

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6. Harvesting the Vermicompost

Once the feeding surface of the vermicompost bed is about 5cm away from the top edge of the box this is the time to empty the worm farm. This is because the bottom layer of 5-10cm will start to go “sour” or anaerobic as the weight of the worms, vermicompost and water becomes too heavy. The solution is to totally remove the vermicompost and start again. However, the trick is in doing so while keeping as many worms as possible for making the next batch of vermicompost. This is how to do that:

- i. Do not feed the worms for two weeks to make them hungry.
- ii. Then it is time to bait the worms with either finely ground chicken feed or flour of some sort, for example, wheat, corn, buck wheat, flax etc. Sprinkle a good two handfuls of this flour or mash on the top surface of the bed. Clumps need to be avoided as they would ferment and be toxic to the worms.
- iii. Then put a black plastic sheet on top of the vermicompost and close the lid. This will decrease air circulation and should trigger a fake migration forcing most of the worms to the top surface. They will then stay at the top and feed for a few days.
- iv. Two days later pull back the plastic cover from half the bed and quickly scoop up the top 5cm where the majority of worms should be (Picture 7). Then repeat the exercise with the other half of the worm farm. This has to be done quickly as the worms do not like sunlight as it burns them. Place the removed top layer in a secure area where the worms cannot escape (on the ground would be an invitation for them to burrow for their lives).



Picture 7

- v. The worm farm can now be emptied of its vermicompost. This is best covered up or stored in an area out of contact with direct sunlight and kept moist. A small minority of worm hatchlings will be left in the vermicompost, but these will be a welcome addition to any area the vermicompost is used in.
- vi. The worm farm process can then be started all over again with a layer of straw placed on the bottom of the empty worm farm. Then the original top layer of worms and the material they were removed with can now be placed back in the worm farm. Having a

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much larger number of worms right from the beginning will help the process of making vermicompost happen a lot faster.

Having more than one worm farm operating at different stages of the worm farm life cycle can allow for a regular supply of vermicompost and vermiform leachate for liquid fertiliser. This will help provide a significant boost in the health of the soil and the production of plants.

