

Composting

Worm Farms and Bokashi

A "How To" Guide



wipeoutwaste



What is compost?

Quite simply it is a mixture of organic material that is used as fertiliser! Generally, the ingredients used to make compost come from our gardens and kitchens (food scraps) although organic material is anything that was once living.

Compost results from the decomposition or break down of garden and food scraps (organic material). It can take anywhere between 2 and 18 months before compost is ready to use. The length of time depends on the compost method used, what gets put into the bin, the time of year and how often the material is turned.

As the organic material breaks down, it changes and becomes what is known as humus. During the process, soil micro-organisms, worms and insects convert the organics into a soil-like material which can then be used in the garden.

The benefits of compost

- It returns organic matter to the soil.
- It reduces the harmful effects of organic waste in landfill (e.g., water pollution, emissions of the potent greenhouse gas methane and bad smells).
- It reduces the need for chemical fertilisers in your garden.
- It reduces rubbish collection costs.
- It reduces the space needed for landfills.
- Producing your own compost saves money.



Composting tip 1:

When adding food scraps, it is especially useful to add an equal quantity of brown material on top such as dry leaves to reduce odours.

How to get started

- Choose a site carefully. Ideally, it should be warm and sheltered.
- Start with a layer of coarsely chopped twiggy woody material on bare soil or grass.
- Add alternate layers of green matter (nitrogen rich) and brown matter (carbon rich) preferably in layers no more than 5-10 cm deep
- If you cannot be bothered layering, just make sure there is a mixture of green and brown matter. NB: Smaller pieces make quicker compost.
- Limit all materials, including grass clippings, to thin layers.
- Avoid cat/dog/human faeces, meat, fish, bones, oil and invasive weeds.
- The heap should have a cover, e.g., plastic lid, underfelt, tarpaulin.

- Rodents can be kept out by cutting out a piece of chicken wire larger than the bin base. Place it underneath the bin on the soil and fold the edges 10cm up the sides of the bin.
- Compost activators such as a dried blood and bone can be added to the compost to speed things up
- Sprinkling on lime and untreated wood ash can help balance pH and reduce smells.
- The heap should be as moist as a wrung out sponge
- Avoid excessive moisture by keeping the heap covered.
- To work properly, your compost heap needs to reach temperatures between 30 and 60°C. From time to time, check that it is heating up in the centre; it should feel warm.
- Compost needs air - turn and mix it up to aerate and speed up decomposition.
- Once an open heap is 1 metre in height, you should finish it by turning it with a pitchfork and mixing it up every week or two.
- Compost is ready when it becomes a sweet, dark, crumbly material and the original components are unrecognisable.
- If compost is well maintained and turned often, it can be ready in as little as 6-8 weeks. If it is never turned, it will be ready in 12-18 months.
- When it is ready, put it on the soil or dig it into your garden. You can also use it for pot plants and for potting up seedlings.



Make your own compost bin

If you are making your own bin, you can use a wide range of material, including chicken wire, wood, plywood, bricks, concrete blocks, etc.

It must be on the soil and no smaller than 1m high x 1m wide x 1m deep and no larger than 5m³.

For large amounts of garden waste, units can be made from wood, bricks or concrete blocks. Ready access from the front is necessary.

Stacking bins have the advantage of being moveable and can be extended to cope with large amounts of waste. Black polythene or sacks may be used for lining, warmth and moisture control. Wrap a netting frame around wooden stakes. Line these with newspaper or cardboard to retain heat.

Types of compost bins

Before you choose a compost bin you should consider what you will be putting in it. Larger, open bins are better for people with large amounts of garden waste.

Smaller, enclosed bins are more suitable for households with large quantities of food waste as they provide a barrier to rodents.

You may find you need both! There are a number of points to consider before you buy a bin. These are:

- The number of people in your home
- The size of your garden
- The capacity of your bin, taking the above into consideration
- Your ability to turn compost with a garden fork

Composting tip 2:

Make sure you get all your questions answered by the retailer or manufacturer before purchase and check out whether there is any further support available once you have purchased the bin. Make sure the bin is manageable for you!



What is worm farming?

Worm farming is another alternative to composting; it is also referred to as 'vermiculture' or vermi-composting. Usually tiger worms are used for worm farming in New Zealand, though red worms can also be used.

Worm farming uses the same principles as composting, but it does not generate heat, making it cold composting.

Worms happily eat food scraps and excrete valuable materials known as vermicasts and worm tea which are high in nitrogen, phosphorous and potassium (NPK) compared to ordinary soil.

This makes them valuable for plant leaf growth, root and stem strength, flower and fruit growth.

The benefits of worm farming

- Casts and worm tea are fantastic for plants (always dilute the worm tea with water to the colour of weak tea – usually about 1:10).
- If you have mostly kitchen waste and live in a home with little or no outdoor space, a worm farm is a good option.
- Same environmental and cost benefits as composting
- Kids enjoy them.

How to get started

- Choose a site which is sheltered from sun, wind and rain. Carports or porches are ideal.
- Use a layer of bedding first—e.g., hay/cocconut fibre/shredded cardboard/paper. Bedding should be damp and porous.
- Add worms. 1,000 (250g) is fine; 2000 is even better!
- Food can then be added. You can cover food scraps with damp newspaper or cardboard to limit flies and odour.
- Worms can eat their own weight each day but do not overfeed at start (e.g., for 250g of worms give about 200g of food)
- Worms need air but not light (worms are photophobic). They also like a moist environment, so water (hose) occasionally. They do not like very hot or cold conditions (10-30 degrees is OK).
- Add dry leaves or torn up paper products if it is too wet – the working area should be as damp as a wrung out sponge
- Add food scraps regularly. Smaller pieces will be eaten more quickly and prevent odours.
- Small flies or white worms/bugs indicate the worm farm has become too acidic; add a sprinkling of lime to neutralise the pH.
- After a few months or when a layer is full, you should harvest the casts.
- Remove the top layer and take off the bottom layer. This bottom layer contains the casts. It is ready when few worms can be seen.
- Remove worm tea from the bottom level (dilute when using) and pop on your garden or pot plants.
- When current layer is full, you can add an-

other layer to your worm farm. Place a new layer on top of the old one and then add bedding (paper/straw/manure) and then add more food scraps

- Only add food to the new layer. The worms will migrate slowly to the food layer
- If you have large layers in your plastic bin and want to harvest casts earlier, add a layer of chicken wire instead of a new plastic layer

Types of worm bins

Bins generally have two to three layers; some bins can have extra layers added to increase capacity. Note that it is easier to harvest worm casts from bins which have more shallow layers. Size, price and functionality vary a lot, so ask questions before you buy!

- A tray/layer/stacker system allows for easy removal of worm casts.
- Bins with taps allow the worm tea to be extracted easily
- Some bins stand on legs which can be easier to proof against pests.
- Some bins are made from recycled plastic and made locally
- Sizes and costs vary from \$20 to \$200
- Worms and food scraps are added to the top working tray which has a vented lid. More levels can be added once the first working tray has filled with worm casts
- A three-tray system allows for easy removal of worm casts with minimal loss of worms



The diet

What worms like

- Moist fruit and vegetable scraps
- Coffee grounds and tea bags
- Aged horse manure
- Dirty paper
- Crushed eggshells
- Vacuum cleaner dust
- Hair

What worms do not like

- Spicy food, chilli, onion, garlic
- Meat and milk products
- Flour products
- Large amounts of cooked food
- Garden waste
- Shiny paper
- Citrus/very acidic fruit



Stockists

Worm bins can be purchased from various outlets including your local garden or hardware store. Look under "worm farming" in the Yellow Pages and call first to get an idea of products and prices, or call the Sustaining Hawke's Bay Environment Centre on (06) 870 4942

Make your own worm bin

You can easily make a worm bin out of large buckets, polystyrene trays or an old bath.

If you use a bath, remove the plug. If you want to, you could build a frame to allow the bath to sit securely at waist height. Bricks, posts or blocks may be used for elevation, and for stability, i.e., 100-150mm height (allowing room for the liquid collection container placed beneath the plug outlet). The plug outlet end must be no less than a 5 degree fall to the lowest point to

achieve adequate drainage. Roofing such as ply or corrugated iron will be needed to shed water and provide protection from summer sun.

Place into the base of the bath 1.5m of 65mm perforated drainage pipe with two layers of old stockings. This seals the ends and covers the perforations which stop the pipe blocking. Add pumice sand or scoria to a depth of 75mm then place shade cloth, doubled over and cut to fit, on top of filtering layer.

Bedding

Free-draining fibrous matured compost is ideal given that it is not going to produce heat. Dampened shredded corrugated cardboard and lunch paper give increased air availability and reduce the risk of bedding material heating up. You need to water well and leave at least two days. Then check for temperatures over 25 degrees. If there are any unpleasant odours, apply two handfuls of garden lime and mix in. Only apply old lawns clippings, as fresh clipping heat up and cook the worms.

For quick results, 500g-1kg (2,000-4,000 worms) should be enough for your worm farm to cope with 400gms to 800gms of mixed food waste each day. This volume will increase as the worms multiply. Spread worms on to bedding and spread food scraps in one area and rotate feed sites.

As the bath fills use a garden fork and loosen the bedding; this increases air circulation and reduces bedding compaction.

To remove the casts, once the worm farm is full (after 9 to 18 months), place a plastic sheet or large container next to the bath and using a garden fork remove the top half of the worms' bedding. This is undigested food and is where a majority of the worms will be. Place this to one side.

Remove all casts. Rinse drainage layer thoroughly catching all liquid. Replace the contents that were put aside and commence the feeding, forking, watering process when required.

Your bath worm farm will ultimately digest about 1-2 litres of mixed organic waste a day.

Common worm farming problems

Problem:	Cause	Solution
Rotting food	Too much for population	Feed less
Fruit/vinegar flies around farm or small white bugs and worms	Too acidic	Cover food with damp paper and add Lime to increase pH
Worms climbing up sides/ worms very fat and pale	Too wet	Add paper products and dry leaves, gently fork holes in the working layer
Ants	Too dry or acidic	Add water/lime. If your worm farm is on legs, place each leg in a container of water to stop such pests from getting in.
Food rotting and not eaten	Too much food/wrong food/ pieces too big	Add less food, break into small pieces
No worm tea	Not enough water	Add water

Worm Farming

How many worms do I need to start?

1000 is OK, but a bin takes some time to get going; 2000 worms (500gms) will get a bin working much more quickly and efficiently.

What food can I use in a worm bin?

Worms like a mix of fruit and vegetables (70%) and carbon material (30%). Carbon material includes scrunched up envelopes, handee towels, tissues, shredded paper - any paper that is NOT shiny and coloured or plastic coated is OK. Worms don't like citrus, bread, meat, onions, garlic, excess kiwifruit or large amounts of grass and leaves.

What if there are lots of fruit flies?

Add a decent sprinkling of lime and wait a day or two. If you still have flies, add more lime and carbon material (e.g., paper or dried leaves).

Do I need to lime my worm bin?

A small handful of lime or gypsum once a month helps to keep the food sweet.

What do I do if I go on holiday?

Add to the bin as follows:

1-2 weeks: empty out your fridge of any fruit and vegetables

2-3 weeks: dried grass or coconut fibre from a garden centre or worm grower

4+ weeks: coconut fibre block from garden centre or worm grower.

How much do I dilute the 'worm tea'?

Worm tea is very high in nitrogen and needs to be watered down to about 1:10, or so it is the colour of weak tea. The liquid is so rich that it can be harmful if not diluted.

What can I do with the worm casts?

Worm casts can be mixed with potting mix, seed raising mix and compost (about 20% casts to 80% mix), and is the perfect medium into which to plant seedlings, plants and trees. Casts do not have to be diluted for use in the garden, but make sure they are mixed in to the soil. For best results, add compost and mulch as soil cover.

Composting

What makes my compost smell?

A compost high in nitrogen with no air will become acidic. Add carbon and turn your compost.

How do I keep rodents out?

Add grass clippings to increase heat and turn regularly.

What can I not put in a compost bin?

Do not put in meat, bread, heavy unshredded prunings (see "What not to compost").

How long do I have to wait until my compost is ready?

A well maintained compost bin will produce compost in 3-4 months in summer, and up to 6 months in winter. However, times vary depending on the method, bin contents, time of year and regularity of turning.

Do I need to add water?

If you add a 50/50 mix of nitrogen, materials which are wet, and carbon materials that are dry, it will be of a crumbly consistency.

How will compost help my garden?

Compost feeds the soil, helps with water retention and encourages earthworms into your garden.



What is Bokashi?

Bokashi is a generic Japanese term, meaning 'fermented organic matter'. Widely used throughout New Zealand, Bokashi Compost-Zing turns household organic matter into highly productive garden compost in just four weeks.

Bokashi reduces organic waste volume, enhances soil condition, reduces odours and speeds up the rate of decomposition.

The system is often showcased at local and national Eco, Home and Garden shows. Bokashi is available through the Sustaining Hawke's Bay Environment Centre, organic product retailers, and various gardening outlets.

Not only is it easy to use, readily available, and

environmentally friendly, it also gives you many advantages over regular composting:

- up to 50% quicker composting time
- less odour as the food decays
- increased growing power
- healthier and more productive plants
- requires no mixing
- produces a natural pour-on liquid fertiliser as well as physical compost.

For more information contact the Sustaining Hawke's Bay Environment Centre on (06) 870 4942 or visit www.bokashi.co.nz

Garden bag and bin collections

There are green waste collection services available to Hawke's Bay residents. Some accept invasive weeds as well as ordinary garden waste. Please refer to the table below.

Garden waste disposal

The Council Refuse Transfer Stations in Napier and Hastings accept garden waste at discounted rates. There are also businesses which accept or collect green waste for composting. You will need to contact them directly to check what kind of garden waste they will accept, their opening hours and their charges.

NAME	ADDRESS	PHONE NUMBER
Blackbridge Transfer Station (Saturday to Monday only)	Mill Road Haumoana	06 870 0574
Henderson Road Transfer Station	Henderson Road, Hastings	06 879 4623
Redcliffe Transfer Station	Springfield Road, Napier	06 844 4945
Bio Rich (by Agreement)	www.biorich.co.nz	0800 246 742
Clean Earth Ltd – Green Waste	www.cleaneearth.co.nz	06 844 1060
Bay Environmental Bins Ltd	PO Box 8747 Havelock North	06 877 7297
For more information on Bokashi Compost-Zing System or worm farms contact:		
Sustaining Hawke's Bay Environment Centre	220 Russell Street, Hastings	06 870 4942



Useful websites

www.earthworms.co.nz
www.mastercomposter.com
www.wormsrus.co.nz
www.kiwiearthworms.co.nz

Thank you and
enjoy composting!



Brought to you by the Hastings District Council, Napier City Council
and the Wipe Out Waste Education Programme