

Fascinating Worm Facts

- Some earthworms consume their own weight in a combination of food, water and soil every day.
- Their dry body weight is two-thirds protein. They are low in cholesterol.
- Under ideal conditions two mature worms can multiply to 1500 in a year.
- A worm system 1.0 metre long by 2.0 metres by 30 centimetres deep can cope with the average compostable household waste for a year.
- A well run worm system does not smell offensive.
- In a healthy farm paddock there is more weight of protein below the surface in the form of earth worms and soil organisms than there is on the hoof above the ground.
- Of the 8000 worm breeds in the world 2500 to 3000 are earth worms. The balance live in water. These figures do not include parasitic worms found in the intestines of animals.
- There are around 300 identified species native to Australia and nearly 200 native to New Zealand.
- Worms mate only with worms of their own species.
- Worm eggs - capsules - can survive drought and the coldest Australian and New Zealand winter, provided they are deep enough in the soil or it is well mulched.
- Earthworms have no known diseases.
- The influence on most healthy worm populations by birds is insignificant. The exception being in heavily grazed pasture and wet from winter rain where birds can reduce worm populations by up to 50%.

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A GUIDE TO WORM COMPOSTING



**MARLBOROUGH
DISTRICT COUNCIL**

WORM COMPOSTING

Worm composting is a simple way to recycle your organic kitchen waste. Almost 20% of a typical landfill is made up of kitchen scraps!

Worms will eat your kitchen scraps and reward you with a rich valuable compost that your plants will thrive on.

Worms can be bought online or from Bunnings.

WHY COMPOST WITH WORMS

It's an **EASY** and **FUN** way for people of **all ages** to recycle kitchen waste as rich compost. **TRY IT!**

BENEFITS

- Problem-free worm composting can be undertaken all year round, both inside and out. The great advantage of worm composting is that it provides people who have limited space with an effective means of recycling their kitchen wastes. It requires only minimal space, effort and a little knowledge.
- Worms are **fun!** and make good pets for children. They are an excellent way to help children become environmentally aware and are a fascinating addition to any school's science/environmental curriculum.
- If you are a keen gardener you will already know about the many benefits of compost. Essentially, the addition of compost to your soil replenishes organic matter (humus) which, in turn, improves soil texture, nutrient content, moisture retention and encourages micro-organism activity and plant growth.
- Environmentally it makes good sense. It saves you money by reducing the amount of organic waste going to the landfill. It helps minimise the odorous rubbish bag and the associated hassle when this attracts dogs. It is a simple, cost-effective, natural way of recycling your organic kitchen waste, and conserves a valuable resource.
- Being a natural plant food and soil conditioner, worm compost provides the householder with an excellent high quality material particularly suitable for container growing, but equally as good for enriching the garden.
- Addition of compost to our gardens is probably the best means of enhancement and maintenance of soil fertility in all aspects.

HELPFUL COMPOSTING TIPS

- Kitchen food waste has a high moisture content. To prevent sour slimy conditions developing, creating odours and attracting flies, add food regularly rather than in large quantities. Also food in excess will sour and putrefy before the worms can deal with it.
- Chopping or mincing food scraps before feeding speeds up the composting process.

Inclusion of crushed egg shells normally provides sufficient calcium which stimulates earthworm reproduction and activity. In addition, however, as worms and other compost organisms don't like an acid environment, a monthly light sprinkling of dolomite or garden lime is desirable to ensure a good environment for the worms.
- Acidic conditions are often indicated by an increase in the numbers of Potworms or nematode worms, tiny white worms which are usually present in small numbers. The addition of a little dolomite or lime will correct this.
- Worms need to be kept moist but not soggy. If they dry out they will die, or if it's too wet they will drown.
- Fruit and house flies can be troublesome if added food isn't buried in the bedding.
- If odours are produced, this is usually because the unit has been overfed, allowed to become too moist or the bedding has become packed, limiting air flow. Odours generally result from anaerobic (lack of free oxygen) conditions, so it is important to correct not only for odour reasons but also because the conditions may well be toxic to the worms which need oxygen to live.
- As worm composting doesn't generate heat, any seeds included with the food may still germinate, eg; tomatoes, pumpkins.
- Finished worm compost is nutrient rich and as such is an excellent material for topdressing container plants and as an ingredient in potting mixes. It can also be used in the garden to condition the soil every time you plant (a handful mixed into the soil when transplanting vegetables etc when transplanting vegetables etc gives plants a good start). Use in small amounts.
- Compost used as part of a potting mix or as a topdressing around potted plants should not contain worms as they tend to upset the functioning of the potting media.
- You may simply add it to a commercial potting soil or incorporate it in your own special mix.

should be avoided as these create slimy conditions, odour and fly problems.

- Use of tough woody material is not recommended unless chopped into small pieces;
- Do not use onions, garlic or hot spicy food scraps.

don't add:

- Bones, glass, plastic, tinfoil or other inert materials.
- If adding aged (composted) manures to your wormery, avoid chicken manure as this tends to be too acidic for the worms.

Also

6. HARVESTING THE COMPOST

As time passes, the bedding, along with the food waste, is converted into worm manure (castings). It becomes heavier, more compact and changes to a dark brown soil-like material. This stage is usually reached within three to four months. The quality of the worms' environment is diminished, as they have effectively fouled it with their manure. For the health of the worms and continued efficient wormery operation, it is time to remove some, or all, of the finished compost. There are several ways of doing this - discover which is best for you. Here are some ideas:

- The easiest method consists of removing, with a hand fork, the top 150 mm worm rich layer, and setting this aside for seeding the next bin. The remaining contents can then be removed for either immediate use or stored until required. Addition of the top layer back into the container with fresh bedding starts the whole process again. Alternatively,
- Tip the entire contents of the bin onto a plastic sheet or a concreted area (best done outside). Spread the compost out to form a layer about 100 mm thick. The worms dislike light and burrow deeper into the compost to avoid it. Slowly remove the compost in layers, until eventually you have a mass of wriggling worms which can be added back into the worm bin containing new bedding.

Be careful that the worms don't dry out.

You may wish to manually separate out the worms. Children usually love this! Watch for small worms and the tiny (average around 4 mm) yellow/pink oval shaped cocoons, which may contain baby worms.

- You may prefer to simply move the finished compost over to one side of the bin, place fresh bedding in the space created, and add food waste to the new bedding only. The worms will gradually move over and the compost can then be removed. At this stage you may wish to start extra worm bins or give some worms to a friend.

GETTING STARTED

Anyone can start a worm bin.

All you need is a suitable container, bedding material and, of course, worms.

KEY POINTS:

- Buy, recycle or make a suitable container (wood, plastic or metal).
- Drill or punch a few holes in the bottom of the container for aeration and drainage.
- Place moist bedding (shredded newspaper or similar) in the worm bin, plus one or two handfuls of coarse sand or topsoil.
- Add tiger and/or red worms (1000 or so).
- Bury kitchen waste (vegetable and fruit scraps) just below the surface of the bedding, preferably in a sequence around the bin.
- Cover with sacking or a loose fitting lid that will keep the material from drying out and provide a dark environment for the worms.
- Additional fresh bedding should be added at least every two months.
- Harvest compost (worm castings) after three to four months and feed your plants.
- Top up bin with fresh bedding to replace the compost removed.
- **It's as simple as that.**

SETTING UP A WORMERY

What You Need and How You Do It

1. THE CONTAINER

Firstly you will need to obtain one or more suitable worm containers, which may be either plastic, wood or metal. Use your imagination and recycle an old bath tub or wooden box, drawer or a plastic basin, bin or crate, or alternatively buy or build one. Wooden containers provide good insulation and, because they are absorbent, excess moisture in the wormery may be less of a problem. Plastic containers are convenient but have a tendency to keep the compost too wet at times. Experiment and find out what works for you and your worms.

The container should ideally be 20-40 cm deep with a relatively large surface area (about 40 x 40-60 cm), because worms like to work near the surface. A shallow container also allows for better aeration of the bedding. As a guide allow approximately 2000 cm² surface area (or a

volume of 60 litres) for every 200 grams of food waste per day. You can calculate the amount of waste you generate daily by collecting potential worm food in a container for one week, weighing it, and then dividing the weight by 7.

Depending on size, drill or punch 8-12 holes about 10 mm diameter in the bottom of the container for aeration and drainage. Worms need air to live. If contents become too wet, drill more holes. Bins should be raised up on bricks or wooden blocks to aid air circulation and drainage. By placing a plastic tray underneath to capture excess liquid, you can obtain an excellent liquid plant fertiliser - use diluted at the rate of 1 part liquid to 10 parts water.

Cover the bin to conserve moisture and provide a dark environment for the worms.

Consider using several containers for ease of lifting and moving.

2. WORM BIN LOCATION

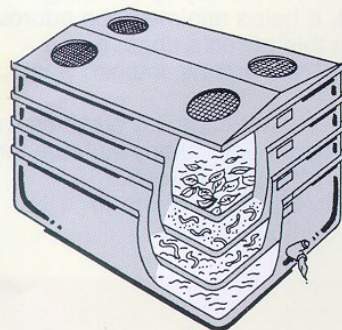
Locate your worm bins where access is convenient. Bins can be kept in sheds and garages, on verandas, patios, porches, balconies or in the backyard. A sheltered spot that gets some sun is ideal, but be careful as a bin in full sun may get too hot, especially in summer. When outside temperatures drop below 10°C, bins should either be moved inside or kept well insulated if left outdoors. Wrapping carpet or something similar around the bin for insulation will help prevent the worms from freezing during the winter.

3. THE WORMS

Two species are especially suited for worm composting, namely Tiger Worms *Eisenia fetida* and Red Worms *Lumbricus rubellus* (which are also known as red wiggler or manure worms). These types thrive on moist organic materials such as food scraps, eating as much as their own weight per day. The recommended ratio of worms to food is: for about 400 grams per day of food waste (a typical amount for a family of four to six), use a minimum of 500 grams of worms (just over 1000 worms) and preferably 900 grams (about 2000 worms). It doesn't matter if you are unable to obtain this number of worms initially - just reduce the quantity of food fed accordingly. If you provide ideal conditions, the worm population will steadily increase, doubling their numbers every 40 or so days.

Where to Obtain your Worms

You can check yours or a friend's compost heap for worms, visit horse stables or a farmer with a mature manure heap or order them online or via a retailer.



◀ Different types of commercial wormeries are available



4. THE BEDDING

The worms require a moist bedding in which to live and lay their eggs. Suitable materials include shredded and moistened newspaper (avoid coloured print, and tear newsprint into strips about 25 mm wide) as well as cardboard, peat, straw, aged manure or compost. Sawdust is not recommended due to its resin content. Experiment with different bedding materials, for worms like a varied diet. A mixture of ingredients is quite acceptable.

Addition of one or two handfuls of coarse sand or topsoil (preferably silty loam) will provide the grit that the worms need to grind their food. Three quarters fill the worm bin with damp bedding that has the consistency of a squeezed out sponge. **It must be moist but not soggy.** Gently place bedding in position avoiding compaction, as air spaces are necessary for successful composting, helping to control odours and facilitating freer movement and air for the worms.

5. SUITABLE WORM FOOD

Worms are omnivorous, eating both plants and meat tissue, so most organic waste can be composted. They will eat most kitchen vegetable/fruit scraps or peelings, shredded paper, egg, handy towels, tea bags/leaves, coffee grounds/filters, crushed egg shells, bread scraps, leftover cereal, cottage cheese, plate scrapings, biscuit crumbs, even ice cream. Meat/fish scraps and dairy products may also be used, but feed in moderation, making sure you bury (not too deeply) them in the bedding to stop odours and discourage flies. Meat and fish scraps are not recommended until you are familiar with worm composting. If odours are troublesome, these ingredients are best left out. It is beneficial to occasionally add a little semi-mature compost (past heating stage), aged horse manure or similar to your system. This provides a source of decomposer micro-organisms which help to soften the food for the worms, as well as providing additional food.

Food to Avoid

- Citrus or acidic fruits such as oranges, lemons, grapefruit and kiwifruit are best avoided, or used sparingly, as these make the conditions too acid for the worms;
- Garden waste is generally not suitable for these worms, also materials such as grass clippings may heat up quickly, which the worms will not appreciate, and it may even kill them. Garden waste is best dealt with by conventional composting methods;
- Fats, cooking/salad oils and oily foods