Australian Worm Growers Association Vermiculture Inc

Info-sheet

How to Vermicompost

How to Compost

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Special points of interest:

- Compost requires water to be active. This means that the microbes have sufficient moisture to facilitate breakdown.
- Compost requires cover to prevent odour.
- Compost is not as bioactive as worm castings.

Compost: The basics

Compost is the result of the action of bacteria and fungi on organic matter. Essential to this process is moisture. Without water the bacteria and fungi will sporulate waiting for the return of moisture. As the bacteria slowly breakdown the complex organic molecules, the nutrients in that material are slowly released into a form that is available to plants. All organic material will breakdown naturally, however there are two ways of this happening; aerobically or anaerobically.

Aerobically composting simply requires oxygen to work. Aerating a compost heap can be performed by physically turning the pile to introduce oxygen to the heart of the pile. This can result in the loss of some nutrients through the volatilization of nutrients in the odour. There are two types of anaerobic conditions; putrid or fermentative. Fermentative compost provides an ideal product, common to Japanese composting techniques. While putrid anaerobic compost will produce an undesirable product. From here, unless otherwise stated, anaerobic will refer to putrid anaerobic conditions.

Compost site selection

Compost bins/heaps should be placed in a well-drained area that ensures the compost is not sitting in water. This will create anaerobic conditions. Direct sunlight will increase the rate of water loss, which will require the addition of water. Ensure your compost is not close to any noxious weeds or grasses that may take over your compost. Placing your compost heap near water over-flows will allow you to cut back on the requirement of the addition of water.

Composting waste

Composting can use different feed stock such as food scraps, manures, mulch wood and grass clippings. It ideally needs to have a Carbon to Nitrogen ratio (C:N) of 25:1 to 30:1. Mixing this material well will provide a better chemical and biological reaction in the mixture. When new feed stock is fed to the compost it should be mixed through thoroughly. It is important not to overturn the compost, as it will discourage certain beneficial organisms. Once you have put new waste into the compost you can cover the pile with a mulch cover to reduce odour and vermin.

Unlike using earthworms, compost is relatively straight forward. Compost is best when it is aged, or mature. That is, it has had time for microbes to consume all the readily available nutrients and convert them into stable forms. If compost has become anaerobic, adding more cover to prevent odour emission will eventually turn the organic waste into compost.

Using compost and its benefits

In any environment, biodiversity of organisms is the major sign of health.

Compost is used in a similar way to vermicompost. It can be used as a top soil dresser or can be placed at the base of root bulbs when planting for the maximum benefit. Compost, unlike worm castings, can be made in larger scale. An appropriate application of larger amounts of compost can be mixed through your garden soil. This will add a higher amount of organic carbon through your garden and provide substantial benefits.

Organic carbon is the most important aspect of compost, as it provides a home for beneficial microbes and contains humus with a high CEC. The organic carbon also has the ability to hold around 80% its weight in water, which ensures a high degree of moisture retention. Inversely, over-using compost can have the potential make your garden sodden, and at deeper levels, potentially anaerobic.

As soil experts will tell you, taking a handful of soil from virgin environments such as grasslands or forests will provide your compost with microbes your backyard might not otherwise have. In any area that has been clear felled or intensively used for agriculture, there will be reduced diversity of micro-organisms, particularly if the top soil layer has been washed away. In any environment, biodiversity of organisms is the major sign of health. For example, compare the eerie pine forests dotted around Australia with very little wild life, to the lush rainforests where the air is alive with diversity.

Earthworms: The basics

Before you get your earthworms you need to create an environment for them to thrive in. There are 3 types of earthworms; endogeic (complex burrow systems), anecic (vertical burrows), and epigeic (live in the leaf litter). All earthworm bins contain this third type, epigeic. It is important to note the features of an earthworm environment are akin to the forest floor and animal manures. From now, the information handout will refer to earthworms as being epigeic.

In earthworms' habitats, they perform several crucial roles, such as aerating the soil and consuming the decaying organic matter. While consuming the organic matter, earthworms grow special bacteria in their stomachs, which they spread throughout their castings. The action of earthworms moving through the waste produces a valuable fertiliser which is readily available for plants to consume.

Earthworms are also found around root clusters of plants. The earthworms eat around the roots providing better drainage, room for roots to grow, and the spreading of beneficial bacteria.

Earthworm bin site selection

Worm bins are best suited to the southern aspect, where direct sunlight is minimal. This reduces water loss through evaporation and improves population survivability.

Earthworms consume their weight in waste each day, so be consistent when feeding them to avoid dramatic population increases and decreases. If you are planning to take a trip away, provide earthworms with extra food to ensure their survival in your absence. If you forget about feeding your garden critters, it is possible to grow up a population in very short order. There are 3–7 earthworms per earthworm cocoon. Once born, each baby earthworm takes 45 days to sexually mature. After they lay their first cocoon, 1 baby earthworm can turn in to 117,000 in around 270 days.

Earthworms love moisture. They require around 80% moisture content in their environment. This is akin to the forest floor described earlier. Too much moisture and nutrient supply will result in anaerobic conditions. This is where bacteria have consumed all available oxygen and produce odorous molecules in decomposition, rather than producing carbon dioxide. This is similar to lactic acid build-up in humans after strenuous exercise. Anaerobic conditions are hallmarked by the smell of putrid odours. The perfect place for earthworms is somewhere not to dry and not to wet, but most importantly, out of direct sunlight.

Feeding earthworms

Earthworms require 60-80% moisture levels. Earthworms actually respire through their skin so avoid feeding them any oil or fats, which coat their skin and cause them to suffocate.

After feeding earthworms, it is important to cover the food organics with coarse mulch. This is a food source, but also helps to prevent drying out and reduces the likelihood of vermin and insects. Avoid using any fine type of mulch, especially grass cuttings, as this can create an anaerobic layer which will kill your earthworm habitat.

Anaerobic environments are categorised by an unpalatable odour.

If your worm bin or pile is well drained you should add all the water you can to it. This could include diverting any unused drain water or placing your worm bin close to water tank overflows. Avoid any water containing detergents, as detergent can disrupt the skin breathing of earthworms.

Harvesting the product

Depending on the type of worm beds you are using, it is important to consider where the product harvesting point is. If you feed from the top, the earthworms will eat what is at the bottom moving up towards the food as you add it to the top. Eventually your bin will be at capacity with the product trapped below. Once the layer of organics increases to a depth of 30cm or more, the product will become anaerobic and putrid. This is because composting earthworms only live in the top layer of the soil and will not aerate below 30cm.

The true benefit of vermicast is found when it is used as a top dressing, or placed under the root ball when planting trees. As worm castings take so long to produce, it is useful to mix it with compost, which is easier to produce and will provide you with more product. Research has shown that the maximum benefit produced from castings mixed with compost is reached at 50:50, but a 20:80 mix of vermicompost to compost will give excellent results.

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Using the product, and its benefits

Aside from the carbon contained in vermicompost, earthworms benefit the soil by creating soil structure and allowing better drainage. They spread beneficial microbes through the soil and reduce compaction, allowing roots to better penetrate into the newly fertile soil.

Earthworms also release trace amounts of plant hormone-like molecules such as auxin and gibberllin, which encourage plant growth.

Vermicompost is a very rich product and contains a vast array of different species of bacteria, fungi, and other microorganisms.

Vermicompost is also very high in humus and fulvate, which are products of the breakdown of organic matter through the action of the earthworm-selected microbes mentioned above. Humus is an excellent source of nutrients, due to its large surface area which provides more interaction points for nutrients to hold onto. The bacteria that have made the humus also give it a 'sticky' layer, which increases its strength for binding to nutrients. This is known as cation exchange capacity (CEC).

Foliar sprays from vermicompost or worm teas contain beneficial microbes that help the plant secure nutrients from the environment. These same microbes also provide competition to disease-causing microbes, such as root rots and leaf curl, that often play havoc with plants.

Australian Worm Growers Association Vermiculture Incorporated (AWGAVI)

See us on the web

http://ausworm.com/

'Promote the use of earthworms to recycle organic waste for the betterment of our environment'

The Australian Worm Growers Association Vermiculture Inc. (AWGAVI) is a nationally focussed not-for-profit body for worms and vermiculture that has been continuously registered with Consumer Affairs Victoria since 1993. (Until the current name was adopted in 2000, the AWGAVI had been known as the Australian Worm Growers Association Inc., or AWGA). The location of registration of the AWGAVI does not restrict the types of activities, which can be organised anywhere in Australia.

There have been seven Presidents of the AWGAVI since 1993, including the current one. In chronological order, they have come from respectively Queensland, South Australia, New South Wales, Victoria, New South Wales and Victoria.

The aims and purposes of the AWGAVI are set out in its Rules of Association, and are listed at the AWGAVI's website.

Apart from looking after the interests of members, undertaking actions which widen the business opportunities in vermiculture, disseminating information, and conducting a valuable educational role, the AWGAVI operates a website which includes a discussion forum. It has also been a useful avenue for consultations between the private and public sectors. During the period 1996 to 1997 the then members of the AWGAVI cooperated with CSIRO to develop field trials for vermicast in two South Australian vineyards. In 1997, the AWGAVI organised a series of conferences in four state capitals featuring Dr Clive Edwards, one of the world's renowned experts on vermiculture. In the period 1999-2002 the then AWGAVI Executive had initiated and organised industry-wide consultations (with input from many individuals from outside the AWGAVI) to develop a non-mandatory product standard for solid vermicast (AS4454-2003). In October 2003 the AWGAVI, jointly with the Organic Federation of Australia, had arranged a public presentation about "on farm vermiculture" at the Second National Organic Conference in Adelaide. Over the past fifteen years, there have been two occasions when an industry-wide survey has been conducted, and the AWGAVI have made a useful contribution. There were several past occasions when there had been media coverage of the vermiculture industry that had included interviews of AWGAVI representatives.