About Vermicasting

Vermicasting, done in a systematic way, transforms food waste into a rich, odorless fertilizer, and quite fast. Dr. Hala Chaoui from Urban Farms Organic, Inc. (UFO) explains how to use free tools developed by UFO to design your own effective vermicasting system.

Food scraps can be processed through earthworms into a rich fertilizer which is called vermicasting. Vermicasting is a wonderful source of fertilizer for balcony gardeners. Earthworm casts (vermicast) are a nutritious organic fertilizer for houseplants too. A vermicasting system can be sized to process the daily food scraps of small or large households and can be set up indoors or outdoors (on a balcony!).

If designed around the earthworms' feeding requirements, vermicasting does not produce odor or attract flies. Earthworms can survive at temperatures between 0 and 35 degrees Celsius, so insulation during winter and/or a reflective surface in summer might be needed. The worms perform best at room temperature (25 degrees Celsius).

Red Wigglers (or Eisenia foetida) are the earthworms of choice for processing waste. I summarized the biology of earthworms and their feeding requirements in a Vermicasting Factsheet written for OMAFRA (Ontario Ministry of Agriculture, Food and Rural Affairs). The ideal feed of Red Wigglers is a biodegradable waste mix with a carbon to nitrogen (C/N) ratio of 25, a bulk density of less than 640 grams/litre, and 75% moisture. Earthworms do not tolerate high salinity levels, which is why material like broilers' waste needs to be pre-composted before use, and compost amended with NPK cannot be used in the mixture. Acidity should be kept low, so dairy, eggs, meat and fruits need to be limited to less than 20% of the mixture volume. Detergents and other toxins need to be avoided. Optimal Feed Mix is a free application by UFO that allows you to adjust the recipe of a feed mixture to give it the right properties, without inflating the mixture volume.

Volume of waste per day, in Litres =	3.0
Amount of starting medium, in Litres =	39
Weight of earthworms, in kg =	2
Weight of earthworms, in lb =	4.3
Height of a screen bin, in cm =	27
Length of square base of a screen bin, in cm =	52
Screen bin content when full, in L =	73
Screen bin content when full, in Kg =	22
Transition from 1st to 2nd bin on:	day 15
Length of square base of outer box, in cm =	57
Height of the outer box, in cm =	69

How many Litres of food waste do you produce per day (0.05 to 4)? For more than 4 Litres, see instructions below.

Resulting amounts of earthworms, starting material, and dimensions of the pair of screen earthworm bins (placed inside an outer box, as shown in the figure below)

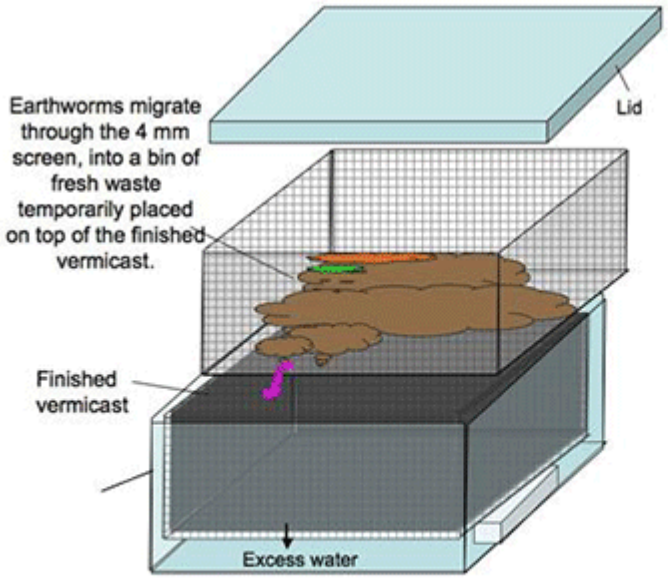

Figure adapted from OMAFRA's (Ontario Ministry of Agriculture) factsheet on Vermicasting, at www.urbanfarmsorganic.com

Earthworms need to absorb both oxygen and water through their skin to survive. This is achieved by placing them and their medium in a porous 5-sided container. A container made of 4 mm screen walls will allow air in and keep excess water out, to maintain earthworms' optimal living conditions. Earthworms are sensitive to all light waves except the color blue. This is why the porous container needs to be encased in a light-tight outer container, to allow the earthworms to safely reach for the waste at the surface. They do not tolerate alcohol or heat, so to prevent waste from fermenting or heating up, the waste layer (and the container height) needs to be 30 cm or less. Earthworms can eat 75% of their weight per

day. Knowing the waste production rate allows you to calculate the right quantity of earthworms for the bin so that the waste you add is consumed on a daily basis. Since worms do not perform well if they are crowded, enough medium should be used to keep them at a density close to 150 worms/litre.

The UFO Earthworm Bin Calculator generates the dimensions of a 2-bin vermicasting system, along with the amount of earthworms and starting medium required to meet the feeding and living needs of Red Wigglers, allowing waste to be consumed as fast as it is produced. A 2-bin system is used so that after 15 days out of a 30-day cycle waste is added to a second bin, which attracts earthworms out of the first bin and separates them from the finished vermicast. The finished product is a rich fertilizer ready to use safely on plants. When it is two weeks of age, most of the ammonium in this material turns to nitrate, a plant's favorite form of nitrogen, and the level of beneficial microbes increases in it. Even when fresh, vermicast does not have high levels of salts and that makes it safe to use on plants.

For free downloads of UFO's Optimal Feed Mix and Earthworm Bin Calculator and more ideas on how to quickly process food waste, visit www.urbanfarmsorganic.com.

Thanks to Toronto Balconies Bloom for this article