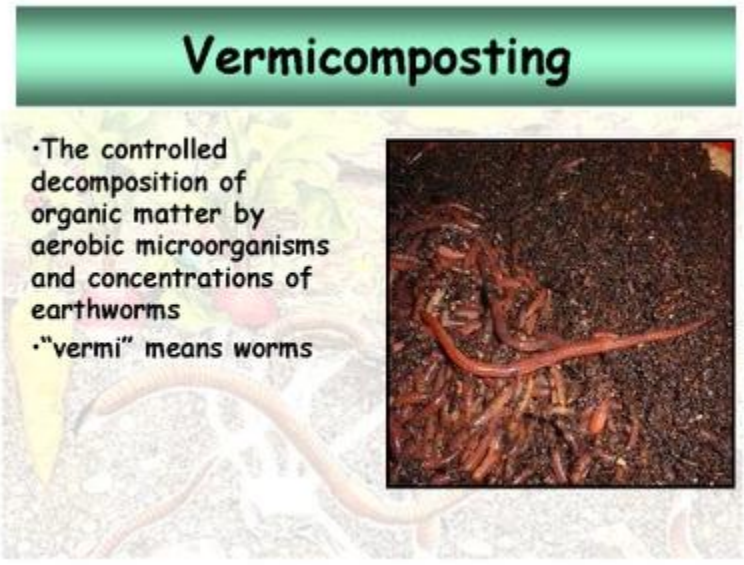
Vermicomposting

Capt.S.K.Bhandari



What is vermiculture

It defines the thrilling potential for waste reduction, fertilizer production, as well as an assortment of possible uses for the future. Vermiculture enhances the growth of plants that provide food along with producing prosperous and financially rewarding fertilizer. The “vermi” or earthworms are important in enriching the soil with organic matter which comes from biodegradable materials such as dead plants and animals which the earthworms ingest.

Vermicastings :

Vermicastings is earthworms' excreta with much nutrients and beneficial micro organisms. Vermicastings also known as earthworm castings, worm castings.
The most important ingredient to produce proper compost, are the worms commonly known as Red Wrigglers (Kechwas), and not the fresh organic material.

Vermicomposting Box or Container

Wooden box - Cardboard box - Clay pots - Clean trash barrels - Dug up pits lined with HDPE sheets or Brick and plaster.

The most important thing to keep in mind when choosing a vermin-composting container is that the box should be shallow and wider than it is height.

For each kilogram of food waste you produce per week the Bin should be 60 centimeters squared. For example. An average size vermi-coposting bin for a household of two people is 30 cm high x 40 cm deep x 60 cm long. If you think you produce more vegetable scraps than the average household of two people then you should consider using a larger bin.

How to build a worm home
Worms need air to survive. They can live in a plastic bin or wooden box with several air holes punched or drilled in the sides and top.

Monitor the moisture content of the bin, and if you find you have problems with excess water, then add holes to the bottom for drainage.

You should cover these holes with mesh or screen to prevent worms from escaping. Place a pan under the bin to catch the drainage water. The Red wrigglers in your bin can tolerate a wide range of temperatures, but they should not freeze or get too hot. The worms will survive in temperatures from 5 degrees C to 32 degrees C.

Precautions:
Maintain the moisture at 50-60 % level in the pit.
Temperature between 25-28 ºC.
Base material (FYM) should be partially decomposed.
Proper airation should be provided without disturbing the worms.

The vermicompost bins can be grouped into three categories:

Non-continuous: It is an undivided container. A layer of organic matter is placed in the bin lining the bottom. Worms are then added and organic matter is then added in a layer above the bedding. Another layer is added on top of the organic matter and the worms will start to compost the organic matter and bedding. This type of bin is often used because it is small and easy to build. But it is relatively difficult to harvest because all the materials and worms must be emptied out when harvesting.

Continuous vertical flow: A series of trays are stacked vertically on top of one another. The bottom tray is filled first, in a similar fashion to the non-continuous bin, but

is not harvested when it is full. Instead, a thick layer of bedding is added on top and the tray above is used for adding organic material. Worms finish composting the materials in the bottom tray and then migrate to the one above. When a sufficient number of worms have migrated, the vermicompost in the bottom tray can be collected and should be relatively free of worms. These bins provide an easier method of harvesting, as they do not all have to be emptied out.

Continuous horizontal flow: A series of trays are lined horizontally. This method too relies on the earthworms migrating towards a food source in order to ease the process of harvesting. The bin is usually constructed to be similar to a non-continuous bin but is longer and lies horizontally. It is divided in half, usually by a large gauge screen of chicken wire. One half is used until it becomes full, then the other half is filled with bedding and organic matter. In time, the worms migrate to the side with the food and the compost can then be collected. These bins are larger than a non-continuous system but still small enough to be used for small-scale worm farming, with the added advantage of being easier to harvest.

Setting up a small-scale Worm Farm
A plastic bin with a lid to keep away the flies and to cut down on odors while the matter is decomposing. However, your worms will need oxygen, so drill holes in the bottom of the bin for ventilation and drainage and further help this process by placing the bin on some bricks to elevate it off the ground.

Place some bedding in the bin for the worms . The bedding could be either or all of the following:

Bedding for the worms
Shredded paper - Torn up newspaper - Old bark mulch - Peat moss or hay
Dried leaves - Sticky parts on envelopes

Do not use glossy paper or magazines. This should not be more than about a fifth of your bin space. Remember that the worms eat the bedding, so you need to replenish this every few months.

Worms
Earth warm 1000-1200 adult worms (about 1 kg
per 100 kg of waste material) Common sp. Eisenia foetida & Eudrilus eugenia

What to feed the worms
Cty waste, kitchen waste,vegetable market wastes etc.
Fresh dung
Waste : Dung ratio 1:1

Get your food scraps that you have been saving up. The best scraps are fruit and vegetable peelings, fruit skins, apple cores etc. If you want to help your worms along, some of those scraps could be liquidized in a blender to quicken the process. Additions such as cow, sheep, pig or chicken manure is a bonus, but it is not a necessity.

What not to feed the worms
In setting up your vermicompost avoid feeding the worms the following: meat, fats or dairy products, citrus, onions and garlic, fish, bones, tobacco, or pet or human manure. Too much fat prevents the earthworms from breathing properly as they breathe through their skin. Also avoid using too many watermelon skins as they really don't have a lot of nutritional value for the earthworm and they also disrupt the moisture levels of the compost. If your lawns have been sprayed with any weed killer avoid feeding these clippings to the worms.

Maintaining the Vermicompost Bin
Make sure that you have enough moisture in your bin, without it getting too wet, and making sure that the compost is alkaline rather than acidic.
The bin contents should be turned over on a regular basis, it's best to do this every 3 days.

What the worms need
The worms require 3 things to exist:
Oxygen - Moisture - Food Scraps - A dark place to live.

Make sure that your soil never smells sour. If this happens it means that the soil is too wet. If it smells sour then add calcium carbonate, also known as garden lime which is very different to ordinary lime which will kill your worms, crushed egg shells, dirt, sand, or more newspaper to soak up that excess moisture.

Feeding the Worms

There are two methods of adding food scraps to the bin.

Top feeding: This is when food scraps and biodegradable matter is placed directly on top of the existing layer in a bin and then covered with another layer of bedding and soil. This is repeated every time the bin is fed.

Pocket feeding: A top layer of bedding is maintained and food is buried beneath by drilling down into the bedding. The location of the food is changed each time, rotating around the bin to give the worms time to decompose the food in the previously fed pockets. The top layer of bedding is replaced when necessary.

After about six/eight weeks, the worm castings will become visible indicating that the vermicompost process is complete. This is a soil-like material that has moved through the worms' digestive tracts). After about 4 months it will be time to separate the worms from the compost and will be ready for harvesting.

Nutritional composition of vermicompost and conventional compost

Nutrients	Vermicompost	Conventional compost
N	1.9	1.4
Mn (ppm)	500	260
Cu (ppm)	48	40
Zn (ppm)	100	80
K (%)	0.8	0.7
P (%)	2	1.8
C:N ratio	13.6	20.6

EXPECTED EARTHWORM PRODUCTION

1. Ave. wt of breeder earthworm	1.0-1.5 gms
2. Ave. number (per kg)	1000 worms
3. Earthworm mating schedule	Once a week
4. No. of eggs per capsule	3-5 eggs/capsule
5. Expected mating/product/month	5000 eggs
Initial: 1000 breeders	2500 babies
x 5 eggs/capsule	1250 babies/wk
x 50% hatching	5000 babies/month
x 50% survival	30000 babies &
x 4 wks. or 1 month.	5000 breeders
x 24 wks. Or 6 months.	
Computation:	0.35
5000/mo. X 6 months. = 30000 babies	
The initial 5000 babies will then become breeders at the end of 6 months.	