



Gardennote

Compost, manure and flies

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Many gardeners and small landholders use compost and animal manure to improve their soil's structure, texture, aeration, fertility and water-holding capacity.

Compost and animal manure are favoured as garden fertilisers because they supply nutrients to the plants slowly and improve the water storing properties of the soil. There is general agreement that plants grown in fertile soils with sufficient water are healthy and have a good pest and disease resistance.

One hazardous downside of using raw manure is fly breeding, which can also occur in uncovered compost heaps. Allowing flies to breed can cause



Figure 1(a): Stable fly. Photograph by Jim Kalish.

a nuisance to neighbours and constitute an offence under the "Fly Eradication Regulation" (Department of Health Act 1996).

In the metropolitan area, stable flies are a problem and the use of untreated poultry manure by (commercial) growers is restricted to periods when fly breeding is controlled by cold night time temperatures. Stable flies are blood-sucking insects which attack animals and humans. Composting of organic materials prevents fly breeding. This Gardennote describes techniques of organic waste recycling and methods to minimise fly breeding in manure and composting facilities.



Figure 1(b): Stable fly (*Stomoxys calcitrans*).
Photograph by Bruno Herbelin

Composting

Compost is an aerobically decomposed, biologically active material of largely organic origin. While it can vary in texture it is typically dark brown in colour with an earthy appearance and smell.

The composting process should be managed to ensure that temperature, oxygen and moisture are maintained within certain ranges.

All organic material can be composted and the ratio of carbon to nitrogen (browns to greens) in the mixture should be in the range of 25-40:1 (by weight). Too little nitrogen will cause the material to break down too slowly, while too much nitrogen will cause excessive heating and a loss of nitrogen. Manure is a very good source of N for the composting process. Take care when handling manure by wearing gloves as it may contain dangerous pathogens. Dog and cat manure could contain parasite (worm) eggs and should be avoided.

The composting process will be accelerated if branches and other bulky material are shredded. Composting requires oxygen. This is achieved by physical turning of the compost at regular intervals.

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Moisture levels are equally important for microbial growth and their activity will decline when moisture levels drop below 40 per cent. Moisture levels above 60 per cent can result in anaerobic decomposition and odours. In this situation, the composting time will be longer and the compost quality reduced.

Commercial composting establishments aim to minimise composting times and manage the process using two phases:

- **Thermophilic – hot phase.** This period lasts about six to eight weeks, depending on conditions, materials and management. The temperature ranges between 55°C and 70°C. If the temperature exceeds 70°C it should be reduced by turning and aeration. These temperatures destroy weed seeds and pathogenic micro-organisms, while the beneficial microbes, responsible for organic matter breakdown, will survive.
- **Mesophyllic phase.** Temperatures are less than 50°C and fall over time, stabilising at 20 to 25°C. This period is usually referred to as the maturation phase and generally takes another four to six weeks.



Figure 2: Covered compost heaps at City Farms, East Perth

With small scale composting in home gardens, these high temperatures can be difficult to achieve and in these situations, composting takes much longer.

At least two compost heaps should be alternated to allow for sufficient maturing time after establishment. Regular turning and covering of the compost heaps will reduce or prevent fly breeding, since flies breed in decomposing organic material near the soil surface.

Compost tumblers (revolving drums) are commercially available and are easier to handle. Make sure that the compost is regularly wetted to keep the moisture level sufficient. A guide to



Figure 3: Compost tumbler

adequate moisture is when you can just squeeze a little free moisture from a handful of material.

The average mature compost will have approximately 1.5 per cent Nitrogen, 0.25 per cent Phosphorus and 1 per cent of Potassium available to the plant. After application, more nutrients will become available as more organic material is broken down by micro-organisms. On sandy soils, the compost application rate (which is applied and incorporated before planting) is approximately 2 kg/m². A coarse compost used as a mulch to minimise weed growth should be applied to a depth of 50 to 75 mm. Plants may still need additional nutrients after compost application. Maximum benefits from compost will only be obtained from regular repeated use.

Other fly breeding sites

All types of rotting/decomposing organic matter are a source of fly breeding. Composting, or attentively covering it up with at least 10 cm of soil, will prevent fly breeding.

Specimen identification requirements

When sending or delivering samples, the following information is required:

- Collector's name, location (where the specimen was found), full address, telephone number and e-mail address, description of the damage and date collected.

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