Eliminating peat from propagation using growing media blocks

Guidance and information note 2 – the composting process

The growers at the three Field Lab sites have all recently made their first batches of compost in the "Aerobins" and are measuring temperatures in the composting materials. This short guidance note explains a bit about the composting process, introduces the Aerobins™ and explains what feedstock mixtures were used at the three sites.

The growers:

- Wester Lawrenceton Farm, Forres, Moray (Pam Rodway)
- East Neuk Market Garden, St Monans, Fife (Connie Hunter and Tom Booth)
- Tombreck Farm, Lawers, Aberfeldy, PH15 2PB (Rachel Wake and Ian Machacek).

Composting

Composting is seen by many to be a bit of a dark art! However, the principles of making good compost are fairly simple, and they are the same whether you are making compost on a garden scale or on a massive commercial scale indoors or outside. Composting is a microbial process and the microorganisms which do the job are present naturally in the environment and on the organic materials which make up the starting materials (often called feedstocks) for the process. Providing there is enough air (or more specifically, oxygen) and moisture, the microorganisms will break the organic materials down over time. As they do so, the heap will heat naturally, then cool gradually over time. It is usually essential to turn the heap at least once, ideally several times during the process, to allow more air in, and to ensure that the cooler materials on the outside of the heap get moved into the middle zone, which usually heats and therefore decomposes more rapidly. Alternative systems have forced or passive air ventilation through one or more pipes buried within the

composting material. Well-run small-scale compost heaps and bins, the contents of which are turned two or more times over the course of the process, can self-heat very well and may produce top quality compost in as little as three months, but six months or even one year are commonly needed.

The natural heating in a compost heap is very important, because it's the heat which kills plant, animal and human pathogens, weed seeds and weed propagules and which denatures viruses. The heat also helps to break down pesticides and other organic contaminants that might be present.

Optimising your good composting process

There are several things which you can do to ensure that the compost in your heaps, bins or windrows provides an ideal environment for the microorganisms to do their job in breaking down the organic wastes and therefore also produce the required heat. These are as follows:

1. Ensure a good mixture of woody/papery/cardboard (high carbon) wastes and green/fleshy (high nitrogen) wastes (very roughly 50% of each by weight) and make sure they are well-mixed. Microorganisms need a mixture of carbon and nitrogen in order to do their work.
2. Ensure that there is sufficient air in the compost throughout the process. It helps if your compost heap is open to the air on one or more sides, or has slatted sides or an internal ventilation pipe with natural or forced ventilation. It also helps if the material that you are composting is coarsely shredded rather than too dense. A garden shredder, which can shred branches is a much better way of creating the woody fraction of your starting materials than to put in paper or cardboard, because it allows more air in during the process. Turning is also a key method to ensure that air gets to all parts of the heap during the process. A lack of air in the lower parts of compost heaps is a frequent cause of slow garden composting processes.
3. Ensure that there is enough moisture, but not too much throughout the heap. This too is related to the structure of the materials in the heap: if materials are too coarse, they are often too dry, particularly in the drier, eastern side of the UK. Similarly, if materials are too fine in structure, they hold too much moisture, particularly in wet areas or in wet years, which most often occur in the west of the UK. In dry areas, you may find that you need to water your heap and cover it to keep moisture in. In wet spells, you may find that you need to cover it to prevent too much rain getting into the heap. A lack, or an excess, of moisture (and you might get both in the same heap, hence the need to turn) is another frequent cause of poor garden composting processes.

Aerobins™

It is perfectly possible to make good quality compost in open heaps or windrows, in home-made wooden bins or in branded plastic containers made by a range of commercial companies. For this project, we decided to standardise the compost bins across all three trial sites, in order to remove one of the variables within the trial. We wanted to use an insulated bin, because we needed to be making compost in winter, over a relatively short (16 week) period, which is not ideal and needed to try to promote self-heating and minimise heat loss.

Constructing the Aerobins™

We chose 400 l Aerobin Hot Composters™ because they had been used successfully to produce good quality compost for use in growing media in a previous project. They are available from several UK retailers. They arrive flat-packed, they have insulated walls, floor and lid, and a central ventilation pipe, which allows passive ventilation through the centre of the composting material. The ones we bought also have a leachate collection system which is helpful in preventing liquid building up at the bottom of the compost.

What we did

Each of our three grower hosts has made a batch of "vegan" compost (which contains no animal by-products) and a batch of "non-vegan" compost which contained animal by-products. Their recipes differed somewhat, because each grower had ready access to different feedstocks in different proportions. Each grower filled the bins with well-mixed, shredded feedstocks and watered the mass if required. The temperatures in the centre of each bin are being measured at least once each week. The intention is to compost material in each bin for around 16 weeks before removing it, sieving it and blending it with other constituents in order to make a growing medium suitable for use in blocks.

The recipes used are roughly as shown in Table 1.

Table 1. Compost feedstock mixes used at the three trial sites

Vegan compost mixes		
Wester Lawrenceton (tractor bucket volume = 50 litres)	**Tombreck (5 loads per aerobin using 15 litre hand buckets)**	**East Neuk Growers (Standard wheelbarrow)**
• 1.5 buckets brown bracken • 1.5 buckets spent strawberry straw with small amount of chopped cardboard • 1.3 buckets finely chopped ramial willow woodchip • 0.6 buckets very wet grass mowings, • 0.6 very wet fresh nettles, • 0.3 shredded comfrey leaves • No water added	• 4 buckets of finely chopped ramial woodchip • 2 buckets of brown bracken • 2 buckets of fresh grass clippings with some rushes • 2 big handfuls of wood ash • 2 big handfuls of smashed up charcoal • 2 big handfuls of mature garden compost	4 barrowloads containing 2 forks of: • straw • seaweed • comfrey • bracken plus 3 barrows of wood chip
Non-vegan compost mixes		
Wester Lawrenceton (tractor bucket volume = 50 litres)	**Tombreck (5.5 loads per aerobin using 15 litre hand buckets)**	**East Neuk Growers (Standard wheelbarrow)**
• 1.25 buckets brown bracken • 2.25 buckets spent straw, mostly chicken bedding • 0.25 buckets chopped wool • 0.25 buckets shredded cardboard • 1.3 buckets finely chopped ramial willow woodchip • 0.25 buckets dried leaves • 2 buckets equal quantities fresh nettles, grass mowings, shredded comfrey leaves • 10 L diluted comfrey liquid • 15 L water	• 1 bucket of finely chopped ramial woodchip • 2 buckets of coarse softwood chip • 2 buckets of brown bracken • 1 bucket of fresh grass clippings with some rushes • 1/10 of a bucket of rabbit poo plus bedding • ¼ bucket of well-separated daggy sheeps wool • 1 shovelful of well-rotted strawy FYM • 2 big handfuls of wood ash • 2 big handfuls of smashed up charcoal • 2 big handfuls of mature garden compost	6 barrowloads containing 1 fork of: • straw • seaweed • comfrey • bracken • wool • manure • food waste plus 1 barrow of wood chip

Mixing the shredded 'vegan' mix - Tombreck

The mixed 'vegan' feedstock at Tombreck, ready to fill the Aerobins

Mixing shredded 'non-vegan' mix at Tombreck

Watering the very dry 'vegan' mix prior to closing the lid on the Aerobin

Future guidance notes

Future guidance notes will cover:

- Methods the project team are using to produce growing media and blocks for the trials
- Methods the project team are using to sow seeds, manage the transplants and assess performance of the blocks and transplants in the trials
- Results of the trials and potential for producing home-made growing media blocks for propagation using the methods described.

Get involved

The project team is keen to engage with others. Growers, horticultural scientists and other interested parties are invited to sign up to receive:

- Guidance notes on techniques being used in the project
- Project updates
- Invitations to online and in-person meetings.

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