and elusive organic miracle, the key to the whole cycle of fertility in providing an important link in the complex chain of biological events that we call 'plant nutrition'.

HUMUS

The incredible vigour and variety of interdependent living organisms in the great rainforests of the world is organised and driven by humic acid and its derivatives. Whether it be a gargantuan tree in a rainforest or a healthy 'monster' cabbage in a continuously compost-enriched home garden where all biodegradables are recycled, the implications are the same: biologically healthy soil produces highly nutritious, vigorous food crops and strong healthy people under the all-organising influence of humic acid, the managing director of the soil supermarket.Humus is the end result (or the residue) of all organic waste containing lignin (the woody material of all plants) that has been degraded by the bacterial, fungal and animal populations of the soil. These living populations are often referred to as the soil microflora and microfauna, or collectively as the 'biomass' of the soil. They are the largely unseen and, for the most part, unrecognised workers that support the whole pyramid of nutrition. In a healthy soil, this unseen biomass per hectare is far greater than the total weight of living things both plant and animal that can be supported above the surface. For example, if 1 hectare of pasture can support 2.5 tonnes of beef, it should, if healthy, support a population of considerably more earthworms alone, under the surface.

The first point to be made then is that most organic fertilisers ultimately aid in humus production together with varying amounts of plant nutrients, whereas chemical fertilisers cannot provide any humus at all, though some of them may aid in its production. There is a great deal more to be said about humus – such as its very high water-holding capacity, its incredibly high exchange capacity for nutrient ions, its insulating properties, its extraordinarily efficient role as a 'buffer' against many toxic agents in the soil and, most important, its ability to improve the structure of soil which, in turn, increases the depth of oxygenation and the capacity of plant roots to forage more efficiently over greater and deeper soil areas. The production of humus is the essential first step for the aspiring organic gardener.

In considering any open-composting operation, the speed and efficiency with which the process progresses depends primarily upon the amount of material available. In general, it can be said that the bigger the heap (within certain dimensions) the faster and better will be the composting. Small amounts of material are not able to maintain the high temperatures necessary for the bacterial processes to continue efficiently, for a small mass is not self-insulating and heat is lost too rapidly to the surroundings. Since the availability of sufficient organic waste for successful composting is *the* first consideration, a list of a few suitable materials will prove helpful for those who previously might not have given the matter a great deal of thought. The list is by no means complete, but will serve to stimulate interest in the possibilities:

Autumn leaves
Urine
Sawdust (preferably not radiata pine)
Bark
Animal manures of any description – pigeon, poultry, sheep, goat, horse, pig, cow, dog etc. (not cat!)
Cotton rags (unprinted)
Cheesecloth
Butcher's paper, white tissues and serviettes,
Bones (preferably burned and crushed)
All biodegradable kitchen garbage
Rotting jute bags and hessian
Chaff
Rotting canvas
Old underfelt (not chemically treated with insecticides)
Grape marc (wine industry waste)
Straw
Spent hops
Buzzer chips
Rice hulls, kapok, coconut fibre and shells
All nut shells
Wood ash (not incinerator ash) in very limited amounts
Newspaper (shredded and not too much)
Cardboard (unprinted and not too much)
Grass clippings
Weeds and all garden waste
Prawn heads, crab and cray shells
Feathers
Seaweed (kelp preferred) but not seagrass
Spoiled hay
Prunings
Dead mice or birds
Vacuum cleaner dust
Crushed snails
Human and animal hair
Wool
Fingernail clippings
Fish heads and bones
Mouldy bread

In selecting materials it is well to remember that in general, very large amounts of one kind of material only does not make good compost. The greater the variety of materials

Making Compost

Compost is the ideal soil improver. It acts like a sponge on the soil, retaining nutrients and water which it supplies to the plants. Decomposers, including certain bacteria, micro-organisms, fungi, worms and insect larvae, make compost. Provided they have adequate air and moisture they will convert a pile of diverse mixed-up organic materials into compost. Without the right conditions the decomposers stop composting. A good size for a compost heap is about one cubic metre.

A hot compost will kill weed seeds and break down quickly. To make a hot compost all the ingredients need to be mixed together at the one time. A cooler compost takes longer but can be added to as the ingredients are collected—mixing is still important, as is air. For either a hot or cool compost, follow the instructions below.

- Collect all the materials you can. To avoid rodents, store kitchen wastes in sealed buckets until you add them to the compost or to worm farms. Try to include some from each of the groups below, making the largest amount the carbon-rich materials.
- Soak dry ingredients in water.
- First, put down a bulky layer e.g. sticks, rocks or dry leaves, preferably on clear aerated sloping ground and at least 20cm deep.
- Add other materials in thin layers (all at the same time for hot compost) until the pile is about 1m high, alternating ingredients from the different groups.
- To counter acidity, sprinkle an occasional handful of wood ash or lime.
- Cover with mulch or soil then with hessian, newspaper or carpet for insulation.
- Keep moist but not soggy and ensure access of air.
- Turn every few weeks and cover during heavy rain.
- Speed up composting by shredding ingredients before using them, by adding compost worms or by turning the compost. If it is processing well the heap will shrink in size quite quickly.
- Compost is ready when it is dark brown to black in colour and smells pleasantly earthy.

Turning Compost

Turning the compost enables you to aerate, monitor and mix it further.

- Remove the lid or insulating covering from the compost heap or bin. If using a bin, remove also the bin and place it beside the heap
- Use a garden fork or gloved hands to move the compost either back into the bin or to a new site for the heap, aerating and mixing it as you go.
- If mixture is dry, add water.
- If wet, add thin layers of dry material.
- If too smelly, add thin layers of carbon-rich material.
- If too slow add small amounts of manure or urine.

Replace insulating material.

Carbon-rich	Nitrogen-rich	Bacteria- and micro-organism-rich	Phosphate-rich	Micronutrient-rich
dry leaves straw garden prunings paper towels egg cartons crumpled newspaper chemical-free sawdust	kitchen waste manure lawn clippings green leaves urine	soil manure mature or semi-mature compost	any part of banana plants citrus and rock melon skins	compost herbs, e.g. comfrey, yarrow, borage mature compost