

# Build and Maintain Soil Health



A healthy soil is the basis for growing healthy plants and food. The organic way of feeding the soil, rather than the plant, ensures the best results for flowers, fruit and vegetables.

The earth you grow in should be teeming with life – worms, fungi, bacteria and other microscopic creatures. These help create its **structure** and **fertility**; key components for creating the right environment for plants to root well and gain nourishment. If you look after your soil organically, you will be supporting the activity of these vital creatures, and improving their diversity. Crucially, you will be avoiding activities that disrupt or harm the soil's rich ecosystem.

The four main methods to build the perfect soil are:

- **Add compost and other bulky organic materials** – this not only adds nutrients but also helps create a good structure for plant roots to penetrate.
- **Minimise digging** to avoid disturbing the complex soil life.
- **Plan your planting** to make best use of the soil's nutrients and to avoid build-up of pests and diseases.
- **Grow certain plants**, such as **green manures**, which hold nutrients in the soil and can help suppress weeds.

In this section, we apply the organic principles to:

- **Soil cultivation techniques** – get to know your soil and how to manage it
- **Soil improvers** – using homemade compost and manures
- **What plants grow in** – using homemade and commercial off-the-shelf mixes, seed and potting compost
- **Fertilisers, liquid feeds and tonics** – what to add and when

# Soil Cultivation Techniques

## Getting to Know Your Soil and How to Manage It

The first rule of organic growing is to understand the soil you are working with – is it light, sandy and doesn't hold water? Or is it heavy, clay and prone to sogginess? Is it alkaline or acid? Once you know your soil (and there are many soil testing kits available) you can improve its structure and fertility naturally.



### FOR ADVICE ON:



1. How to manage your soil, go to [www.gardenorganic.org.uk/managing-your-soil](http://www.gardenorganic.org.uk/managing-your-soil)
2. Green manures, go to [www.gardenorganic.org.uk/green-manures](http://www.gardenorganic.org.uk/green-manures)
3. Planning your planting, go to [www.gardenorganic.org.uk/planting-plan-and-crop-rotation](http://www.gardenorganic.org.uk/planting-plan-and-crop-rotation)
4. No Dig technique, go to [www.gardenorganic.org.uk/no-dig-method](http://www.gardenorganic.org.uk/no-dig-method)





## BEST ORGANIC PRACTICE

- **Apply homemade compost.** This improves the soil's structure, its biological activity and its fertility. For how much and when, see **Appendix 1** on p. 53.
- **Keep the soil covered**, either with growing plants, or an organic **mulch** or **green manure**. This protects and improves the soil, so that it is not left bare for weeds to flourish or valuable nutrients to be washed away.
- **Don't try to change the soil too drastically.** It is better to grow plants best suited to your soil type, rather than pump the soil with unnecessary acid or alkaline substances.
- **Minimise digging.** Digging disrupts the complex systems of life within the soil. It is possible to follow the '**No Dig**' technique, which uses an organic mulch to suppress weeds, avoiding the need to dig.
- **Grow green manures.** These plants can improve soil structure, and some will increase its fertility by capturing essential nitrogen.
- **Rotate your vegetable crops.** Plan your planting year after year, to grow a succession of different vegetables in the same area. This prevents the build-up of diseases in the soil and uses added nutrients most effectively. See **Crop Rotation**.



## ACCEPTABLE, FOR OCCASIONAL USE

- **Digging to clear the ground.** It is best to minimise digging, which disrupts the complex soil life systems. However, this can be one way to clear a patch of persistent weeds.
- **General digging in winter months.** Again, it is best to minimise digging, but clay and heavy soils may be dug to leave them exposed to frost to help break them down.
- **Using black plastic sheets as a mulch to clear weeds.** These deprive the soil of light thus starving the weeds. They should be removed as soon as the job is done. (See **Weed Management** on p. 34).



## NOT ACCEPTABLE IN ORGANIC GROWING

- **Using too much manure and fertilisers.** These can give the soil too many nutrients such as nitrates and phosphates. This encourages excessive growth that is more vulnerable to pests and disease. For suggested amounts to apply, see **Appendix 1** on p. 53.
- **Unnecessary digging.** Too much digging destroys and disturbs the complex soil life systems.

# Soil Improvers

## Using Homemade Compost and Manures

The best way to improve the soil is to use garden compost, leafmould or well-rotted manure. These are bulky materials, unlike a granular or liquid fertiliser, which will improve the soil's structure as well as its fertility.

They are generally made from 'waste' materials – such as kitchen vegetables and garden waste, as well as manure (farm animal waste).

Recycling plant and animal wastes in the soil imitates the recycling of nutrients carried out in nature. As they are high in plant fibre, they provide vital food for the complex life within the soil. The composting, or rotting, process is important. It reduces or destroys any germ carrying bacteria; destroys weed seeds; and makes the material easier to handle and apply. This composting process can take anything from 6 weeks to 12 months to complete.

For advice on how to make compost go to [www.gardenorganic.org.uk/compost](http://www.gardenorganic.org.uk/compost)

There are two types of 'bulky' soil improvers – those made from **plant waste**, such as homemade compost and leafmould; and those made from **animal waste**, such as farm animal and poultry manures.

For advice on how and when to apply them, see **Appendix 1** on p. 53.

**Using bulky organic soil improvers, such as homemade compost, underpins all five organic gardening principles.**



It builds and maintains soil fertility and encourages soil biodiversity. It uses natural resources responsibly, avoids the use of toxic chemicals, and keeps the growing area healthy.



## Plant Wastes

Plant fibre is a vital food for the complex soil life that builds and maintains the soil structure. Vegetable waste, leaves, straw, hay, green plant cuttings and weed leaves are all examples of plant waste. It is important they are composted or left to rot down before use. This process can destroy some of the diseases, and makes the materials easier to handle and apply.

Note: raw materials should be sourced as locally as possible. This prevents excessive transportation and the risk of plundering natural resources from far away.



### FOR BEST ORGANIC PRACTICE, USE:

- **Homemade, well-rotted compost** made from materials in your own garden/allotment/growing plot. This includes well-rotted weeds and plant residues, kitchen waste, low grade paper and card, other compostable household waste, plus shredded woody prunings, lawn mowings, comfrey leaves and other fresh green materials. For how much and when to apply see **Appendix 1** on p. 53.
- **Leafmould.** Made from your own autumn leaves.
- **Worm compost.** Sourced from your own **wormery**.
- **Green manures.** These plants are grown and turned into the soil to improve its nutrients and structure.



### ALSO ACCEPTABLE

- **Compost materials, sourced from other places,** such as: straw and hay (from organic sources), shredded prunings, bracken and hops.
- **Composts made from municipal green waste** and other materials, with a recognised organic symbol or conforming to **PAS 100** standard.
- **Autumn leaves from local parks, cemeteries and other traffic free areas.** Seek permission first if in doubt. *Do not* gather leaves from natural woodland.
- **Chipped and shredded wood and sawdust** that has not been treated with preservatives.
- **Composted bark,** from Forest Stewardship Council (FSC) forests, preferably local.
- **Mushroom compost** from certified organic sources.
- **Biochar and other charcoals.** As a soil additive its use should be limited, due to the energy used in its production and the potential to use non sustainable wood sources.



## ACCEPTABLE, FOR OCCASIONAL USE

- **Straw and hay from non-organic, non-intensive systems.** But check with supplier to avoid some dangerous persistent weedkillers, such as **aminopyralids** and **clopyralids**, which can contaminate the soil for many years.
- **Off the shelf, bagged growing mixes, certified organic.** Although they are labelled 'compost', they are not the same as your own homemade compost. Make sure it is a soil improver, and not for a more specialist use such as for seeds and cuttings (see **Growing Mixes** on p. 14). Never use those which include peat. See **Peat** in *Not Acceptable* below.
- **Mushroom compost from non-organic mushroom producers,** stored under cover or composted for six months before use.

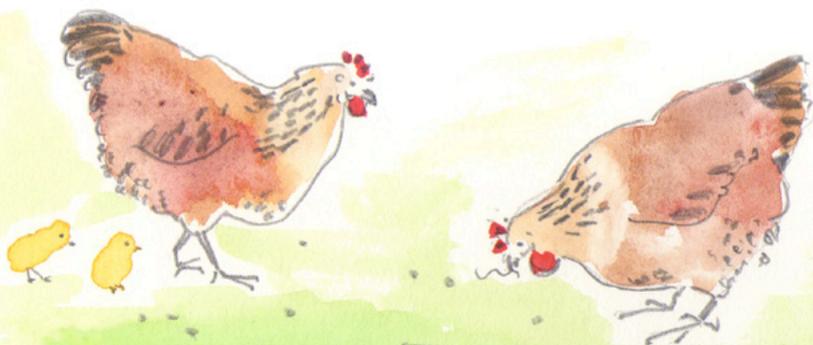


## NOT ACCEPTABLE IN ORGANIC GROWING

- **Peat.** The extraction of peat causes the loss of an ancient habitat, vital for supporting local and often rare life systems. It should never be used. Filtered or recycled peat has been reclaimed from rivers/streams running out of peat land. Some argue that this is still damaging to the natural environment (see **Growing Mixes** on p. 14).
- **Leaves and leafmould collected from woodlands.** This depletes the woodland's natural resources.
- **Any materials contaminated with potentially toxic elements.** Some grass cuttings, from farmland or municipal parks, have been treated with the pernicious weed killers such as **aminopyralids** and **clopyralids**. Their toxicity persists even through the composting process. Check first with your supplier.

## Topsoil

If your garden topsoil is inadequate or non-existent you may want to add to it. Use bought in topsoil, conforming to **BSI standards**.



## Animal Wastes

Recycling animal wastes imitates nature's own way of recycling nutrients. It is the basis of organic soil fertility. Animal waste is usually in the form of straw-based manure, from horses, cattle, pigs, sheep and chickens. Organic farms recycle manures on their own farm, to keep their organic system 'closed' and completely organic. If you have one near you, however, and they have some spare, this is perfect for use in your growing area.

Like plant waste, the manure should have been well rotted down for at least six months or longer. This stabilises the elements and destroys many of the pathogens that cause diseases.



### FOR BEST ORGANIC PRACTICE, USE:

- **Well-rotted manures and bedding from your own poultry and animals**, including herbivorous pets such as rabbits and guinea pigs.
- **Well-rotted straw-based horse, cattle, pig, sheep and goat manures** from local organic systems. See **Appendix 1** on p. 53 for how much and when to apply.



### ACCEPTABLE, FOR OCCASIONAL USE

- **Well-rotted livestock manures, from non-intensive systems** i.e where animals are free range.
- **Poultry manures** from non-intensive egg and meat-producing systems i.e free range.
- **Organic or free range chicken manure pellets.**



### NOT ACCEPTABLE IN ORGANIC GROWING

- **Products containing human sewage.**
- **Manures from intensive 'factory' farming** – these conditions can lead to high use of drugs and disease.
- **Domestic animal waste**, such as cat and dog faeces and litter.
- **Compost activators containing artificial fertilisers.** Activators can help your compost break down, but if they are based on artificial fertilisers they are not suitable for an organic system.
- **Fresh manures** – unless manure is well rotted, i.e for at least 6 months, the nutrients haven't stabilised and pathogens and weed seeds will not have rotted down sufficiently.

# Growing Mixes for Pots and Containers

If you are growing in pots or containers there are a variety of growing mixes you can use. Seeds, for instance, need free-draining material with few nutrients. Mature plants and hungry vegetables need more nutrients, and for as long as possible. The best organic practice is to make your own soil and compost mix, but if you are buying bags from garden centres, make sure the contents are peat free and certified for organic use. See p. 48 for which containers to use.



## BEST ORGANIC PRACTICE

- **Make your own growing mix.** This can be a combination of homemade garden compost, top soil (loam), leafmould, sand and/or grit.



## ALSO ACCEPTABLE

- **Commercial, off-the-shelf bagged mix, with organic symbol or certified for use in an organic system.** Some include filtered or recycled peat products – do be sure to check certification. See **Peat** in *Not Acceptable* opposite.
- **Commercial growing mixes** which contain the materials listed in the green **Soil Improver** section on p. 11.
- **Fertilisers and minerals**, added as part of the mix. Check they are sourced from those listed in the next section.



## ACCEPTABLE, FOR OCCASIONAL USE

- **Top soil** bought in from a sustainable source.
- **Seaweed products** are often used to add nutrients and help the mix hold moisture, but make sure it is sustainably sourced.
- **Sulphur.** This is used to increase the soil's acidity (i.e lower its pH value).
- **Horticultural sand and grit.** Used to help free drainage in the mix, prevents clogging.
- **Vermiculite and perlite.** Used in the growing mix to help with aeration and water penetration.
- **Coir.** Used to create the right soil texture.





## NOT ACCEPTABLE IN ORGANIC GROWING

- **Peat.** The extraction of peat causes the loss of an ancient habitat, vital for supporting local and often rare life systems. It should never be used. Filtered or recycled peat has been reclaimed from rivers/streams running out of peat land. Some argue that this is still damaging to the natural environment. Check the certification.
- **Growing media that contains materials not approved in these guidelines and isn't certified organic.** This includes non-organic fertilisers.

### FOR ADVICE ON:



1. Making compost, go to [www.gardenorganic.org.uk/compost](http://www.gardenorganic.org.uk/compost)
2. Making your own growing mixes, go to [www.gardenorganic.org.uk/peat-free-growing](http://www.gardenorganic.org.uk/peat-free-growing)
3. Growing in containers, go to [www.gardenorganic.org.uk/container-growing](http://www.gardenorganic.org.uk/container-growing)

# Fertilisers

## Organic Fertilisers

Fertilisers, which can be granular, liquid or fungal, are not the same as the bulky homemade compost, discussed on p. 10. On the whole, organic growers don't need fertilisers as their soil is in excellent condition. Think of it as giving a healthy person unnecessary extra vitamins. However, organic fertilisers can be used where a soil deficiency occurs which cannot be remedied otherwise.

Fertilisers suitable for use in an organic garden are of plant, animal or mineral origin. Most of them are waste products; however, the mining and/or shipping of some of these products can have an adverse environmental impact. Choose one with a recognised organic symbol.

### Plant Based Fertilisers:



## BEST ORGANIC PRACTICE

- **Home grown nettle, comfrey and other leaves** dug into the ground in a **planting trench** or added as a **mulch**. (For plant based liquid feeds, see overleaf.)
- **Wood ash**, from wood not chemically treated, and recycled through the compost heap.



### ACCEPTABLE, FOR OCCASIONAL USE

- **Dried seaweed** – check that it is from a recognised sustainable source.
- **Fertilisers based on plant waste products and extracts**, such as comfrey, lucerne, cocoa shells, and *Kali Vinasse* (a high potash fertiliser made from plant material).
- **Mycorrhizal fungi**. If your soil is truly deficient, then these may help as a spot treatment when planting.



### NOT ACCEPTABLE IN ORGANIC GROWING

- **Soot**. Contains fine particles which can readily enter the lungs and irritate the skin. It contains phenols, hydrocarbon aromatic compounds – and is a known carcinogen.
- **Calcified seaweed**. This is usually sourced from coral beds, thus destroying a natural and rare habitat.

#### Animal Based Fertilisers:



### ACCEPTABLE, FOR OCCASIONAL USE

- **Meat, blood, bone, hoof and horn meals**.
- **Chicken manure pellets**, from organic sources only, with a recognised organic symbol.
- **Wool based products**.



### NOT ACCEPTABLE IN ORGANIC GROWING

- **Guano and urea**. Harvesting the former from seabirds or bats can have disastrous environmental consequences. The latter is usually artificially created as a growing fertiliser.

#### Mineral Based Fertilisers:

These can supply important trace elements to your soil, and help raise the pH (making it less acid.) See **Appendix 2** on p. 54 for a full list of **Mineral Based Fertilisers** and **Materials to Provide Trace Elements** which are acceptable (and not acceptable) in organic gardening.



## Liquid Feeds and Tonics

Organic liquid feeds provide nutrients in a more readily available form than composts and fertilisers, but do little to encourage soil flora and fauna. For this reason, in organic gardening they are only used on plants growing in a restricted environment such as a container – seed tray, pot, growing bag, hanging basket etc – or in a greenhouse or polytunnel soil border. As always, in organic growing, the major supply of nutrients should come from the compost or soil in which the plants are growing.



### FOR BEST ORGANIC PRACTICE, USE:

- **None** – your soil is in excellent condition and able to support healthy plant growth!



### ALSO ACCEPTABLE

- **Homemade liquid feeds** made from comfrey leaves, nettles and other plant wastes.
- **Liquid feeds made from manures from your own livestock.**
- **Liquid from a wormery/worm compost.**
- **Liquid feeds based on plant products that are certified organic.**
- **Liquid seaweed extract and bacteria based stimulants.**



### ACCEPTABLE, FOR OCCASIONAL USE

- **Liquid feeds made from farm animal manures** (see **Animal Wastes** on p. 13 to check what is acceptable).
- **Commercially available, organically certified, liquid feeds based on animal by-products.**
- **Products containing trace elements to correct deficiencies** that cannot be corrected in any other way.
- **Products containing waste material from the organic fishing industry.**



### NOT ACCEPTABLE IN ORGANIC GROWING

- **Fish waste products**, unless from an organic source. Much fish farming is highly intensive and uses chemicals to control diseases and water quality.
- **Products containing artificially produced nutrients.**