

## Growing on clay

If your soil is heavy to work, stays wet a long time, is slippery in winter and bakes to a concrete-like texture in summer, you probably have a clay soil.

### How do I know if I have a clay soil?

Rub a spoonful of moist soil between your finger and thumb. Discard any pebbles. If the remainder is gritty, the soil is sandy. If it is sticky and can be easily shaped, it's mainly clay.

If the soil is between these extremes, try to roll it into a cylinder. If it won't form a cylinder, sand and silt are present. If it forms a soft cylinder and feels silky or soapy, silt is present. If it can be moulded into a cylinder, but is not sticky, clay and silt are both present.

Silt consists of particles smaller than sand, but bigger than clay. Silt is useful, as it retains water and nutrients better than sand and does not go sticky and unworkable in wet weather, as clay does.

If the soil is easy to mould into a cylinder and can be bent into a ring, and is shiny when you rub it with your finger, the soil is clay.

### Is clay soil always bad?

Although gardeners often despair of clay soils, most are not that bad. In fact, if you can manage to overcome their lack of drainage and poor structure, they are among the most fertile of all soils. They hold a lot of water, and are often rich in plant nutrients. They can have a good structure if they are treated well. This structure, once formed, persists, making clay soils good ones for no-digging regimes.

The downside is that there are

some extremely difficult clay soils. London and Oxford clays are the most notorious of these.

Dense clays are heavy and hard to cultivate and sticky when moist. They dry out into cobble-like clods. Winter rains are slow to drain, making it impossible to walk on the soil or work it until late spring. If you try to get on to them earlier, they will compact badly which won't support plant roots, which leads to bare patches on lawns and plants failing to thrive.

If you wait too long to work the soil, it will dry out to a concrete-like mass making cultivating hard.

Good management and careful choice of plants can reduce the effects of these problems, making successful gardens possible.

### What constitutes a clay soil?

Technically, a third or more of the topsoil will consist of fine clay particles, and the subsoil will be even richer in clay.

Clay particles are very small. Unlike sand, you can't see them without a microscope. Luckily, they bind together to form small lumps, which are visible. These lumps give the soil an open structure, which allows water to drain, air to get in and roots to thrive.

Where the lumps have been destroyed – by working or walking on wet soil, for example – the soil can become a solid, wet mass.

### How should I manage a clay soil?

Fortunately, the properties of clay

soils will help you to get the best out of them. They shrink as they dry and swell as they get wet. When this happens, the small lumps that give the soil structure are automatically formed.

Encourage as much drying and wetting and freezing and thawing as you can, though only well-drained clay soils will dry out thoroughly.

Maintaining good drainage is important. In summer, the soil dries out and dry clay cracks. By late summer the subsoil should be in good condition.

Plants that grow vigorously help by extracting water from the soil. The deeper the roots go the better. The addition of nitrogen fertilisers, along with good cultivation, produce strongly growing plants that will improve the soil structure and help drainage.

In autumn, be careful not to do more than the minimum of digging to perennial beds and borders. A light hoe or fork over to get rid of weeds, leaving the soil rough, is all that is needed. Over-cultivating will lead to loss of structure under the impact of winter rains.

Where annuals such as vegetables are being grown, dig the ground over, burying weeds and organic matter and leaving the ground as level as you can. Aim for cricket ball-sized lumps. If they are bigger, you might not be able to break them up in the spring, leaving clods of wet clay on the

surface. If smaller, they may fall apart in the winter, breaking down into a structureless mass.

Aim to leave the soil level, or you will have to do so much raking that you are likely to bring coarse, soggy lumps to the surface that will be very difficult to turn into a seedbed. However, aim to create a seedbed with the minimum of raking and cultivating. Too much, and you will destroy the structure. Without this, the soil will collapse over the newly sown seed, making a hard, airless layer from which the seeds will find it hard to escape.

Often, clay soil looks dry on top, but is saturated below. If this is the case, avoid treading on the soil until it is drier; you may have to wait a long time. Ideally, make beds and borders that can be worked from paths. Narrow beds, about 1.2-1.5m wide, are perfect for vegetable growing. Use stepping stones to avoid trampling beds and lawns that are wider.

In summer, clay soils can become very dry. Although some water is needed to keep plants alive during certain years, try to keep watering to a minimum. The drying out and cracking of clay soils is very important to maintain good drainage and extensive watering can prevent this from happening. Lack of cracking will eventually lead to a compacted subsoil that won't drain.

#### **How do I check the condition of the subsoil?**

Dig a hole at least twice the depth of a spade blade, and check for compacted soil with no crumb

structure and no root penetration.

Compacted soil will have to be loosened by deep digging. Ideally, mix some organic matter into this layer to prevent compaction happening again.

#### **What can be done about very dense clays?**

Ordinary good management may not be enough for the worst clays. If the soil is unlikely to break down over the winter, consider cultivating it into a good tilth while it is dry in the autumn. Protect the fine surface from rain by covering with mulch or clear polythene. Polythene has the advantage of warming the soil up in the spring, allowing earlier sowings.

Where soil conditions are extreme, it may be best to stop sowing in the ground when possible, in favour of raising transplants in pots, trays and cells.

#### **How can I check the drainage of clay soil?**

Dig a 0.6m deep hole. Fill it with water; if the water's still there in 24 hours, you have poor drainage.

#### **How do I improve drainage?**

Without drainage, clay soils are difficult to garden. They cannot be worked until late in the spring, plant roots won't penetrate them and the helpful drying and wetting cycles will happen less often.

Putting in expensive land drains is hard work and can make a mess of your garden for months.

However, they are highly effective if you can provide somewhere for the water to go, such as a ditch or

a soakaway. A soakaway is basically a deep hole filled with rubble. To work, it must extend below the clay and be at least 1.8m deep.

Dig a series of parallel trenches every 3-6m across the garden, sloping towards the ditch or soakaway. Lay perforated plastic pipes in each trench, cover with a 23cm gravel layer and then replace soil and plants.

Alternatively, substitute a 25cm layer of stone chippings, topped with 5cm of gravel for the pipes.

Raising the soil level will improve drainage and help the soil warm up quickly in spring. The beds need only be 15cm high and can be cheaply edged with boards or blocks. Improve the soil in the beds with grit and organic matter.

#### **Is it worth adding gravel, sand or gypsum to clay soil?**

Calcium, in the form of lime or gypsum, helps improve the clay's ability to bind into lumps. Gypsum affects the pH less than lime, so use this where the pH is greater than 6.5.

Digging in a 5cm layer of grit, gravel or crushed stone helps open up a clay soil. Don't just fill the planting hole – this creates a sump that will fill with water in wet winters. Although this will help improve the soil, don't expect miracles. Your soil will still be clay and will continue to need to be looked after carefully.

#### **Can I cure a compacted soil?**

If the topsoil is puddled, water drains slowly and plants suffer, you

must sort out the soil's structure.

Deep cultivation and adding as much organic matter as you can will help. Dig the soil in the autumn. Double digging, working down to about 0.5m is ideal.

However, ordinary digging will usually be enough. Use at least one wheelbarrow load of organic matter, for every 2.3sq m of soil that you wish to treat.

Luckily, organic matter breaks

down slowly in clay soils, so once you have increased levels, the effect will last for several years.

When you have got the structure up to scratch, keep it that way with careful soil management. Try narrow beds in your garden, to help you avoid walking on the soil.

#### **Will no-digging methods work on clay soils?**

Clay soils that have a good

structure do lend themselves to no-digging methods. Ideally, get the soil into a good condition and improve drainage.

As long as you don't spoil the structure by mis-timed cultivation or trampling, there should be no further need to dig. Raised beds are ideal for no-digging methods.

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