

Growing on chalky soil

GWF 388

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Chalky soils can be good or bad, depending on the other constituents. They usually have good drainage, but are often shallow and stony, which limits your choice of plants

What constitutes a chalky soil?

All chalky soils will have a chalk layer below them, but can be anything from the light, peaty soil found on top of The Downs to deep, rich clays.

Typically, they contain a lot of flint, which is a nuisance when cultivating and causes problems when digging. Chalk soils don't hold on to water successfully. The other properties of a chalky soil are dependent on their other components, especially the clay content.

How do I know if my soil is chalky?

Expect to find chalky soil in areas where white chalk is exposed, either by deep digging, local roads, blown-down trees or building work.

Small pieces of white chalk in the soil are an obvious sign, though often these are not apparent, especially where the soil is deep and clay-like.

Chalk is almost entirely composed of calcium carbonate. Weak acids like vinegar added to the soil will froth if calcium carbonate is present. This test will reveal particles of chalk too small to recognise by eye.

An extra check is to use a soil test kit and check the pH.

Is chalky soil always bad?

Chalky soils have both good and bad points for the gardener. They are well-drained and warm up

quickly in the spring. You can cultivate and walk on them after rain and they usually have excellent structure. Plants thrive on them if given enough water and nutrients.

However, chalky soils can be shallow, drought-prone, poor in plant foods and very alkaline. Some chalky soils contain a lot of clay, and trampling the soil when wet can compact the subsoil so you may have to break it up by deep digging.

How do I manage a chalky soil?

Shallow chalk soils suffer from drought. They are light, with a low clay content, and are full of flint. Adding organic matter will boost their water-holding abilities. Use at least one wheelbarrow load every 2.3m², or add a mulch at least 5cm deep to damp soil. Organic matter will not last very long in such soils and repeat applications are likely to be needed every year. Firming these soils by treading before sowing and after planting will often help plants to survive.

The presence of chalk means the pH is high, or alkaline. This makes it unsuitable for fruit and acid-loving plants such as heathers or rhododendrons. Nutrients are often in short supply too. Organic matter will help, otherwise add 100g a sq m of a general fertiliser, each year in the spring and top up with 70g a sq m later in the season, whenever plants look as though they need a

boost. If you need to add extra nitrogen fertilisers, use sulphate of ammonia which tends to acidify soil, though it will take years to have a significant effect.

Nutrient deficiencies are commoner on thin, chalky soils than elsewhere. If plants look as though they are lacking food, add extra nitrogen fertiliser. Often, this will allow plants to overcome the shortage by growing better root systems, enabling them to find nutrients more effectively.

To keep nutrients at a good level, add organic matter. Deeper chalky soils are often more clay-like. The mixture of clay and chalk in these soils makes them excellent vegetable growing soils, but they do not grow fruit well.

When moist, these soils are sticky and unpleasant to cultivate, although not as intractable as a clay soil. They also tend to hold less water, so plants need watering sooner. Adding organic matter is helpful, but the excellent structure of chalk soils means that the benefit from organic matter is less crucial than in sandy or clay soils.

Aim to dig chalk soil in the autumn, leaving tennis ball-sized lumps. If the lumps are bigger, you might not be able to break them up in the spring, leaving clods of wet soil on the surface. If they are smaller, they may fall apart in the winter and then break down into a structureless mass.

Leave the soil level, or you will have to do so much raking and

cultivating that you are likely to bring coarse, soggy lumps to the surface that will be very difficult to turn into a seedbed. Aim to create a seedbed with the minimum of raking and cultivating. Too much and you will destroy the soil's structure, without which it will collapse over the newly sown seed making a hard, airless layer through which the young seedlings will find it hard to escape.

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

Can I avoid digging?

With their excellent structure, chalky soils make very good no-dig gardens or raised beds. Ideally, add plenty of organic matter before finishing with digging.

Are there any other plants I should avoid growing?

Potatoes are prone to scab damage in chalky soils. Choose scab-resistant kinds – 'Wilja' and 'Pentland Crown', for example – and water as freely as possible.

Modern hybrid roses often fail to do well on chalk.

How do I recognise nutrient deficiencies?

Magnesium deficiency is common on chalky soils. Look out for pale leaf centres and dead tissue next to the midrib. The base of shoots are likely to be worse affected than young leaves. Brassicas take on red or purple tints. Trees may have brown areas between the veins. Check the diagnosis by dissolving 30g of Epsom salts in

10 litres of water and spray the foliage of affected plants with the solution.

Iron deficiency causes yellow leaves and is due to the iron in the soil being 'locked up' by the alkaline conditions. Treat this with chelated iron compounds.

Should I have a soil test?

A cheap soil testing kit will give an idea of the soil pH. Acid soils have a pH of less than 6.0, alkaline ones are higher than 7.0, while soils with a pH of 6.0-7.0 are about right, or neutral.

For more information ask for GWF394 Lime and pH.

Alternatively take advantage of the Gardening Which? soil testing services that provide highly accurate results, interpreted for your situation.

What if I simply must grow acid-loving plants?

In large gardens on alkaline soil you sometimes see raised beds filled with peat used to grow heathers, rhododendrons and other lime-hating plants. However these are quite labour intensive to create and maintain, and the lime still seeps up from the soil below.

A more practical approach is to use containers filled with multi-purpose compost. *Which?*

Gardening trials have found that special ericaceous (lime-hating) composts are unnecessary. Beware the water supply however – chalky areas usually have alkaline tap water. Ideally, collect rainwater for your acid-loving plants.

Which plants will do well on chalky soils?

Vegetables Spinach beet, sweetcorn and cabbage family vegetables do well, but avoid celery or marrows.

Shrubs Aucuba, berberis,

ceanothus, choisya, cistus, daphne, deutzia, escallonia, forsythia, garrya, genista, helianthemum, hebe, hibiscus, hypericum, kerria, lavandula, ligustrum, mahonia, olearia, philadelphus, potentilla, pyracantha, rhus, ribes, senecio, spartium, spiraea, symphoricarpos, syringa, viburnum and weigela

Trees Acer (but not Japanese acers), amelanchier, arbutus, cercis, crataegus, fagus, fraxinus, ilex, laburnum, pyrus and sorbus.

Conifers Cedrus, juniperus, taxus and thuja

Climbers Clematis and Ionicera

Herbaceous Acanthus, achillea, aconitum, alchemilla, aquilegia, artemisia, aster, aubrieta, centaurea, cherianthus, dianthus, dicentra, echinops, eryngium, euphorbia, gaillardia, geranium, geum, gypsophila, helenium, hemerocallis, heuchera, hosta, iris, kniphofia, lobelia, monarda, nepeta, oenothera, omphalodes, organum, paeonia, papaver, polyanthus, potentilla, rudbeckia, salvia, scabiosa, sedum, sidalcea, solidago, verbascum, veronica and viola

Wild flowers

Shallow, nutrient-poor chalk soil can be ideal for wild flowers that naturally grow on these soils. For more information send for our wild flower factsheets GWF482 Wild flowers for gardens, GWF483 Making a mini meadow, GWF484 Wild flower suppliers.

Herbs

Many shrubby herbs originate from areas with dry, limy soils and thrive on chalk. These include bay, thyme, marjoram, fennel, rosemary and sage. Leafier herbs that like moisture, such as mint and parsley, will do less well.

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