

Lime and pH

Lime is used to make soils less acidic, improve the structure of clay, and help prevent clubroot disease

Soil pH

How well plants grow can be str
How well plants grow is partly determined by whether the soil is acid (low pH) or alkaline (high pH). Lime-hating plants – heathers and rhododendrons, for example – only thrive where the soil is acid. Most plants grow best in slightly acid to neutral conditions, but the majority will tolerate alkaline soils too. A few alpiners actually prefer alkaline conditions.

The amount of calcium in the soil is the main factor in determining whether the soil is acid or alkaline. The action of rain, which is acid, tends to wash calcium out of the soil, making the soil more acid over time. This is especially true of sandy soils, which lose calcium faster than clay soils.

Raising the pH of soil to make it more alkaline is done by adding lime. Lowering the pH, to make the soil more acid, is tricky. It can be done by using sulphur or, more slowly, by using acid fertilisers and manures.

Lack of lime

When the soil lacks lime and is acid, calcium and molybdenum may be too low. Aluminium and manganese, however, become soluble and can be toxic to plants. Growth of young shoots is inhibited under these conditions and the shoots may even die.

The soil will often look lifeless

with mosses and acid-loving seeds like sorrel and dock present.

Testing the pH is a good idea if any of these symptoms occur.

Common liming materials

Ground limestone (sold as garden lime), hydrated lime and ground magnesian limestone are all used to make soil more alkaline. Ground magnesian limestone is used to lime acid soils deficient in magnesium. Hydrated lime is cheaper, but is caustic and unpleasant to use. It can also harm any plants it touches and is particularly damaging if used before sowing and planting. Ground limestone is the best material to use overall.

Getting technical

The pH scale, which is used to describe soil, reads from 1.0 to 14.0, 1.0 being highly acid and 14.0 highly alkaline. Neutral is pH 7.0. There are no hard and fast rules as to what pH to aim for. As a general rule most plants grow best at the slightly acid pH 6.0-6.5.

Clays and heavier soils have a reserve of acidity. This means that more lime is needed to neutralise the acid material in the soil and alter the pH. Lime will also tend to break up acid clays and improve the structure. Alkaline clays and heavier soils have a reserve of alkalinity, so it is extremely difficult to make them more acid, as there

are a great deal of alkaline materials to mop up by adding acid ones.

These heavier soils are said to be buffered against pH change, meaning they only change in pH slowly. Sandy soils have much less buffering capacity, so pH changes are easier to effect, and happen more quickly.

General guidelines

Limestone is slow to react, so there is a lag between liming and the pH changing. Use lime before putting in plants that won't thrive on acid soils. Ideally, mix the lime into the soil during autumn digging. Make sure the soil in 'no digging' plots is adequately limed before you stop digging.

Although professional soil analysis is needed for an accurate pH measurement and liming recommendation, you can get a rough guide using cheap kits from the garden centre. Since these are less accurate, and because liming is difficult to reverse, always underdose and retest to see if you need to apply more. Be cautious when adding lime – it's easy to overdose, and excess lime will lead to an alkaline soil and nutrient deficiencies. As cheap kits are a bit rough-and-ready, add only about half the suggested amount of lime at first, retesting the following year and then add more if required.

How much lime to add

The tables below show how much ground limestone (garden lime) to add, depending on the pH of your soil. This should raise the soil pH to 6.5.

Hydrated lime

Use ¾ of the quantity recommended for ground limestone when using hydrated lime.

Magnesian or dolomitic limestone

This is sold as ‘Dolodust’ or ‘Maglime’. Use the same amounts as recommended for ground limestone on magnesium-deficient soils. It is slower-acting than other forms of lime.

Clubroot control

Aim to raise the pH to 7.5 when this disease infects your brassicas. At this pH the fungus that causes the disease fails to affect roots. Our trials suggest that this is the most cost-effective clubroot control.

Add 270g a sq m (8oz a sq yd) of lime to raise the pH one point in sandy soils.

Add 540g a sq m (16oz a sq yd) of lime to raise the pH one point in loam soils.

Add 800g a sq m (24oz a sq yd) of lime to raise the pH one point in clay soils.

For example: a clay soil that measures pH 6.5 needs 800g of lime a sq m to reach pH 7.5.

You might find that potato scab

becomes more severe at a higher pH. Counter this with extra watering and dig-in organic matter for the potato crop.

Suppliers

Magnesian limestone, sulphate of iron and sulphur:

Garden Warehouse
Standroyd Mill,
Cottontree, Colne,
Lancashire BB8 7BW
01282 873370
www.lbsgardendirect.co.uk

Garden Direct
40 Hillgrove Business Park,
Nazeing, Essex EN9 2BB
01992 890770
www.gardendirect.co.uk

Soil analysis

Soil analysis is a good idea if your garden plants aren't growing as well as they could. *Which? Gardening* provides a high quality, cost-effective service for members – contact us for more details

Application rate: g per sq m (oz per sq yd)			
Test result pH	Clay soils	Loam soils	Sandy soils
6	420 (13)	270 (8)	140 (4)
5.5	800 (24)	540 (16)	270 (8)
5	1200 (36)	800 (24)	420 (13)
4.5	1200 (36)	1080 (32)	540 (16)

Soil texture	Sulphur powder needed to reduce the pH by 1 unit to a 15cm depth (shallow cultivation) g per sq m (oz per sq yd)	Sulphur powder needed to reduce the pH by 1 unit to a 20cm depth (depth of digging)
Light soil	75 (2)	100 (3)
Loams and medium soils	100 (3)	133 (4)
Heavy and clay soils	150 (4)	200 (6)

Making soil more acidic

It is rarely feasible to make alkaline soils into acid ones - they have too much lime in them. The best you can hope for is to make alkaline soils more neutral, and acid ones slightly more acid. If you have unsuitable soil for the plants you want in your garden,

grow them in containers. If you have results from a soil analysis, use the table above to work out how much sulphur to add. Where you do not have accurate soil pH measurements add 35g sulphur a sq m (1oz a sq yd) twice a year until the desired

pH is reached. Check the pH with a cheap test kit. Iron sulphate is sometimes used. It is applied at 150g a sq m (4oz a sq yd) and is most effective used on neutral or slightly acid soils.

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