

# Gardening in alkaline or limey soils



Nutrient deficiency due to alkaline soil on the leaves of gardenia.

Gardening on impoverished, alkaline, sand is a challenge that confronts many coastal Australian gardeners.

Most Australians want to live near the beach and so our coastal homes are often built on sand dune systems with extremely poor soils where nutrients are unavailable to plants.

Drive along the coast and you can see unsuccessful gardens with stunted yellowing plants that look unsightly.

If you want a good garden and live in these areas you can either improve the soil and reduce the soil pH and/or grow plants that are adapted to these soils.

In some cases the soils contain too much limestone and are just too alkaline to be changed, like some areas of the Perth coastal strip where the soil pH is 8.5 to 9.5 meaning that it contains several percent limestone.

Some areas not directly on the coast also have limestone outcrops. Gardens created where there used to be ocean are usually alkaline and some soils with good topsoil have limestone in the lower profiles which means that plants will show the affects of high alkalinity once their roots travel down deeply in search of water.

Choosing plants that have adapted to alkaline soils is the easiest way to have a good garden in limey soils. Many of these plants come from the Mediterranean and there are also a wide range of Australian plants that have adapted to these conditions. Good plant nurseries can give advice on plants that grow well in your area.

## About pH

PH affects plant growth because a change in pH means a different availability of plant nutrients in the soil.

When the pH rises above neutral (7) the availability of iron, manganese, copper, boron and zinc drops. Plants not adapted to a high pH are unable to get enough of these elements, particularly iron, manganese and zinc. This is shown in the yellowing of leaves.

On alkaline soils plants get lime-induced chlorosis which shows up on the leaves as a dark green vein pattern against a pale green or yellow leaf.

While iron is available in the soil the high pH slows the iron uptake by the plant.

## What to do

There are many ways to decrease the alkalinity of a soil. Use compost to improve the soil and as it breaks down the humic acid will leach through the soil.

A quick solution is the application of iron chelates, which is bought as a powder and watered onto the roots. New leaves will return to green in a week but the effect lasts only a few weeks. If it works apply iron compost (see below).

The cheapest material to use to acidify soil is sulphur. Apply about 25g per square metre to sands and up to 100g per sq m to clay. The sulphur is converted by soil bacteria into sulphuric acid which increases the concentration of hydrogen ions in the soil and so lowers pH.

You can also use iron sulphate, using about twice as much as sulphur, however, since it is very salty only apply about a third of it at any one time. Water well after applying, wait a week and if necessary apply some more.

These solutions work best in the warmer months of the year.

## Iron Compost

This recipe is from Kevin Handreck's excellent book *Gardening Down Under*, CSIRO 2001.

Lightly moisten 10 litres of compost or animal manure and mix in one cup of iron sulphate.

Dig holes about 20cm deep in the plant's root zone. Three for a rose bush or 6-8 for a big grevillea. Put the iron compost into the holes and water well.

The plant roots will soon grow into the organic matter. The treatment lasts for several years, unless the irrigation water is highly alkaline.

## Plants that tolerate alkaline soil

### Australian plants \*

*Abelia grandiflora*

Japanese maple (*Acer palmatum*)

Acanthus mollis

WA Peppermint (*Agonis flexuosa*)\*

Candle Banksia (*Banksia attenuata*)\*

Bergenia

Butterfly bush (*Buddleia davidii*)

Grey Cottonhead (*Conostylis candidans*)\*

*Correa pulchella* \*

Rottnest Island Cypress (*Callitris pressii*)\*

*Dianella revoluta* \*

Dianthus

Californian poppy (*Eschscholzia californica*)

Geranium

Spider net grevillea (*Grevillea preissii*)\*

*Guichenotia ledifolia* \*

Native wisteria (*Hardenbergia comptoniana*)\*

Running postman (*Kennedia prostrata*)\*

Red Hot Poker (Kniphofia)

Lavender

Pride of Madera (*Echium fatuosum*)

Coastal melaleuca (*Melaleuca systema*)\*

Rosemary

Oleander

Coastal daisy (*Olearia axillaris*)\*

Thick leafed fan flower (*Scaevola crassifolia*)\*

Cockies' Tongues (*Templetonia retusa*)\*

Tipuana tipu

Thyme

Viburnum tinus