



Minimising salt damage in home gardens

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Dryland salinity is an increasing problem across the Australian landscape and is now becoming a problem in home gardens. Salinity in the garden can be managed in several ways.

Causes of salinity

Soluble (dissolved) salt accumulates in soil over time from the small amount of salt that comes in from the ocean in rain.

Other major causes of salinity include:

- salty groundwater supplies
- rising water tables due to land clearing
- coastal winds depositing salt crystals on plants
- excessive application of grey water.

Symptoms of damage

Dissolved salts found in water and soil are easily absorbed by the roots of plants and transported to the leaf margins where they 'burn' the leaves. Soils with high levels of salt hinder the plant's ability to uptake water and nutrients resulting in poor growth. Burning occurs on leaf tips and margins—yellowing progresses to brown and then black. Leaf shed and 'die-back' of growing tips can also occur and young plants can become stunted. Plants showing symptoms of salt damage will have thicker than normal leaves and appear a darker green as well as being stunted. Grasses appear dark green with burning on the margins.



Salt burn on avocado leaf from saline soil

Salt chemistry

Salinity is the measure of soluble salts found in water and soil and is measured by electrical conductivity (EC). Types of salts include common salt (sodium chloride),

calcium and magnesium bicarbonates, chlorides and sulfates. Other salts such as nitrates and potassium are essential for plant growth.

Which plants are affected?

Some plants tolerate more salt than others. Tolerance is influenced by the type of plant, soil and environmental factors. Strawberries, citrus fruit, peas, carrots, azaleas and roses have a low tolerance to salinity. Olives, figs, asparagus, carnations and chrysanthemums are much more tolerant.

Salt build-up is generally less severe on sandy soils as the salts are easily leached out. Clay soils tend to accumulate salts due to inadequate drainage. Salts will also concentrate in dry soils. Increasing watering during hot dry conditions should remove salts from within the root zone.



Azalea watered with saline water

Characteristics of salt-tolerant plants

Plants that have adapted to highly saline conditions are known as halophytes and occur naturally in mangrove swamps, coastal areas that are affected by salt spray and degraded land affected by rising salt levels. Such plants have modified internal structures that divert salts away from necessary functions.

- Succulents have fleshy foliage high in water concentrations that are able to dilute salts to an acceptable level.
- Salt-tolerant grasses have adapted to prevent salts from entering the roots.
- Other plants have evolved glands that divert excess salt to specialised cells on the leaf surface.

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Succulent with fleshy foliage

Managing salinity in the garden

As a home gardener you can manage your soil, fertiliser, water and choice of plant to minimise salt damage.

Soils

Improve soil structure

- On heavier clay soils, mix in gypsum at a rate of up to 5 kg per square metre to improve infiltration of water and leaching of salt. Gypsum improves the soil texture, making it finer so that water can infiltrate much more easily. Later, the gypsum releases vital nutrients such as calcium and sulfate into the soil which plants can then use.
- Build up soils with organic matter and apply soil wetting agents every year.

Fertilisers

Some garden fertilisers contain chloride, which may add to the salinity problem. Check the fertiliser composition on the label before purchase. Avoid fertiliser that has KCl (Muriate of Potash) as the potassium source.

Water

- Avoid wetting leaves during the day because when the water evaporates salt deposits left on the foliage cause burning.
- Set up drip irrigation which maintains a moist area around the roots forcing the salts to the edge of the wetted zone.
- 'Shandy' bore water with scheme water, either by mixing it in a tank or by watering with bore and scheme water in rotation.
- Isolate salt-sensitive plants from salty bore reticulation and use an alternative water supply.
- If you recycle grey water on the garden use liquid washing detergents which contain fewer salts than washing powders.

Plants

Replace ornamental plants with more tolerant varieties. See Gardennote 194 for a list of suitable fruit, vegetables, shrubs and trees.

Certain varieties of lawns such as saltene (*Paspalum vaginatum*), ryegrass (*Lolium sp.*), fescue (*Festuca sp.*), Queensland blue couch (*Digitaria distichum*) and common couch grass (*Cynodon dactylon*) are suitable for moderately saline conditions.

How do I measure salinity?

Electrical conductivity (EC) is a measurement of dissolved salts in water. These salts conduct electricity. EC is measured as milli Siemens per meter (mS/m). Home gardeners can purchase 'stick' meters from agricultural suppliers. Although they are not as accurate as commercial units, they will satisfy home garden requirements. An EC reading will not indicate what types of salts are contributing to your problem but several laboratories listed in the yellow pages under 'Analysis' conduct water and soil analysis.



Hand held EC meter

Water samples

Take a sample of your water in a 500 mL clear glass or plastic bottle having rinsed it thoroughly with the water to be tested to prevent contamination. To get a true indication of the water to be tested your bore must be run for at least 10 minutes before taking the sample. Samples should not be taken in extreme temperatures as this affects the EC reading.

Soil and potting media samples

Soil tests can only be as accurate as the samples on which they are based. As soils vary in their distribution of plant nutrients, take at least six 100 g samples from the area to be tested and mix them thoroughly into one 500 g sample. The composite sample then becomes an 'average' of the soil. Take separate samples from areas that show different symptoms or changes in soil type. Soil samples are measured as 1 part soil to 5 parts distilled water and are analysed with a conductivity meter.

Further reading

Water quality in home gardens. Gardennote 194, Department of Agriculture and Food.

When sending or delivering samples include the following information:

Collector's name, location (where the specimen was found), full address, description of the damage, and date collected.

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