

Salts in the crop root zone

Introduction

Excessive salt in the crop root zone can reduce crop quality and yield. Dissolved salts naturally occur in river water, groundwater and soils. Common salts include sodium, calcium, magnesium and potassium chlorides, sulphates and carbonates.

Sources of salt

When crops are irrigated, salt is deposited in the soil. Even good quality water typically has salt concentrations of 200-500 parts per million. Hence, for every megalitre of good quality irrigation water applied, between 200 and 500 kg of salt is applied to the soil. Obviously, using higher salinity irrigation water applies even more salt.

Salts can also enter the crop root zone from below. When the groundwater table rises to within two metres of the soil surface, plant roots and capillary rise may pull this water and the salt it contains into the crop root zone.

What does the salt do?

The ability of the plant to extract water from the soil is reduced as salt levels increase. Hence, crops may display symptoms of moisture stress even though the soil is moist. Very high levels of salinity can also have a toxic effect inhibiting root growth and killing the plant.

Do I have a salt problem?

If you have a salinity problem or are likely to experience a salinity problem, you should check the salt levels of both the soil and the water used for irrigation. Salt levels are routinely checked in soil and water analyses or can be simply checked in the field using an electrical conductivity meter. The results are commonly reported in units of deci-Siemens per metre (dS/m). To convert dS/m to other units use this conversion formula:

$$1 \text{ dS/m} = 1000 \text{ EC units} = 1000 \text{ uS/cm} = 640 \text{ ppm}$$

Salt tolerances for a range of horticultural crops are shown in Table 1. These values are a guide only as the effect will vary depending on soil type, leaching potential and irrigation method, and the age and cultivar of the crop.

Table 1. Salinity tolerances of horticultural crops

Crop	Soil salinity (EC _e in dS/m)		Water quality (EC _w in dS/m)	
	Threshold	25 per cent yield loss	Threshold	25 per cent yield loss
Apple/pear	1.7	3.3	1.0	2.2
Apricot	1.6	2.6	1.1	1.8
Avocado	1.3	2.5	0.9	1.7
Beans	1.0	2.3	0.7	1.5
Broccoli	2.8	5.5	1.9	3.7
Cantaloupe	2.2	5.7	1.7	3.8
Capsicum	1.5	3.3	1.0	2.2
Carrot	1.0	2.8	0.7	1.9
Citrus	1.7	3.3	1.1	2.2
Grape	1.5	4.1	1.0	2.7
Lettuce	1.3	3.2	0.9	2.1
Onion	1.2	2.8	0.8	1.8
Peach	1.7	2.9	1.1	1.9
Potato	1.7	3.8	1.1	2.5
Strawberry	1.0	1.8	0.7	1.2
Sweet corn	1.7	3.8	1.1	2.5
Tomatoes	2.5	5.0	1.7	3.4

For more details contact the Growcom members access line on 1800 654 222

Disclaimer: This information is provided as a reference tool only. Seek professional advice for irrigation specifics.



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