

## Soil Health – Recycled Water

The extension of the WID Recycled Water Scheme in July 2009 has required some changes to the way that soils in the WID are monitored and how the health of your soils are reported to you.

The WID Soil Improvement Plan has a list of trigger values for various soil parameters that directly reflect soil health. These trigger values correspond with the levels at which growers may experience some issues with productivity.

The information below provides the trigger values outlined in the WID Soil Improvement Plan and provides possible options to improve your soil condition.

### Salinity

**Trigger level:** E.C.e value of 6.0 dS/m or greater

High salinity in the soil can affect the ability of plants to extract water from the soil, especially in stressful conditions such as high temperatures.

To reduce soil salinity you should examine the following options:

- Increase the irrigation to include more leaching
- Deep ripping to open pathways for vertical water movement
- Laser grading to improve bed drainage
- Underground drains (i.e. tile drains, mole drains)
- Deepen and improve farm surface drainage
- Improve water distribution uniformity of the sprinkler system

### Chloride

**Trigger level:** 600 mg/kg

High levels of chloride are toxic to plants. High chloride often goes together with a high E.C.e reading, but chloride in particular is very damaging to plant membranes.

To reduce high levels of chloride in soils you should follow similar options for the reduction of overall salinity:

- Increase the irrigation to include more leaching
- Deep ripping to open pathways for vertical water movement
- Laser grading to improve bed drainage
- Underground drains (i.e. tile drains, mole drains)
- Deepen and improve farm drainage
- Improve water distribution uniformity of the sprinkler system
- Review fertiliser use to determine whether chloride salts are part of the fertilizer mix

## Sodicity

**Trigger level:** An exchangeable sodium percentage (ESP) of more than 15 %

A high level of sodium is an undesirable property for soil as it reduces the stability of the soil structure and inhibits the movement of water and air through the soil. Sodic soils have a tendency to set hard when they dry out which makes it difficult to cultivate and establish seedlings.

Very high levels of sodium can be toxic to some plants.

To reduce high levels of sodium in soils you should examine the following options:

- Application of gypsum
- Use of soluble calcium based fertilisers (Calcium Nitrate, Calcium Thiosulphate)

## Acidity / Alkalinity

**Trigger level:** Greater than 8.8 pH (1:5 soil water)

A high value of soil pH can cause the following problems:

- Reduce the ability of plants to absorb certain nutrients, such as zinc, calcium, manganese, nitrogen
- Exposes plants to a greater risk toxicity from specific ions, particularly sodium, boron and aluminium
- Gypsum cannot work effectively to reduce high sodium levels
- Decreases soil microbial activity and cycling of plant nutrients

In order to reduce soil pH you should examine the following options:

- Review fertiliser use, taking into account the high nutrient levels in recycled water
- Review the use of lime
- Apply more water for leaching
- Apply nitrogen fertiliser in the nitrate form
- In extreme situations, flowers of sulphur can be used to lower soil pH