

Nutrients

OVERVIEW

- Macro- and micro-nutrients are essential for healthy plant growth.
- In a water source, high nutrients and increased temperature can lead to an increase in biological growth and harmful algal blooms.
- Algae blooms (**Table 1**) and biofilm or bacterial growths can block irrigation equipment and may be health hazards for humans, plants, or animals.
- In some cases, excess nutrients allow blue-green algae to grow in the soil of container plants, potentially leading to pathogenic collar rot fungi.
- More information is available from NSW DPI: <https://www.dpi.nsw.gov.au/agriculture/water/quality/pubs-and-info/blue-green-algae>

Common name	Scientific name
Filamentous green algae	<i>Godophora spp.</i> <i>Hydrodictyon spp.</i> <i>Spirogyra spp.</i>
Stoneworts	<i>Chara spp.</i> <i>Nitella spp.</i>
Blue-green algae	<i>Anocystis cyonea</i> <i>Anabaena circinalis</i>
Diatoms	<i>Navicula spp.</i> <i>Cyclotella spp.</i> <i>Aulacoseira spp.</i>
Euglenoids	<i>Euglena spp.</i>

Table 1. Common types of algae found in water sources.

KEY FACTORS

- Overapplication of fertilisers can lead to excess nutrients and the accumulation of salts and toxic ions in plants.
- Overwatering can lead to nutrients leaching out of container plants into drains, where they eventually accumulate in a water source.
- Surface runoff from agricultural, urban, and industrial areas can introduce nutrients, sediments, and organic matter into water sources, resulting in increased algal growth and turbidity levels.
- Erosion and bushfires, particularly preceding large storms, can result in increased nutrient loads in water sources.

HIGHLIGHTS

- It is important to test water nutrient concentrations, allowing the development of a targeted treatment plan.
- Treatment of nutrients in irrigation water is essential for maintaining optimal conditions for plant growth while preventing nutrient-related issues, including over-fertilisation, nutrient imbalances, and environmental contamination.

MANAGEMENT

- Keep nutrient concentrations in irrigation water within the recommended limits (**Table 2**).
- Regular testing of water quality will help track nutrients in irrigation water and pick treatments.
- Reverse osmosis (RO) systems remove a wide range of nutrients. RO water can be used to dilute nutrient-rich water.
- Filtration systems, settling tanks, aeration pumps, and sedimentation basins can be used to remove particulate matter, which may carry nutrients.

Macronutrients	Upper limit for greenhouse plants
Total Nitrogen	<5 mg/L
Nitrate	<5 mg/L
Ammonium	<5 mg/L
Phosphorus	<0.05 mg/L
Phosphate	<0.05 mg/L
Potassium	<3 mg/L
Calcium	<120 mg/L
Magnesium	<25mg/L
Sulfur and Sulfate	20–30 mg/L
Micronutrients	
Aluminium	<5 mg/L
Boron	<0.5 mg/L
Copper	<0.2 mg/L
Fluoride	<1 mg/L
Iron	<0.2 mg/L
Manganese	<0.2 mg/L
Zinc	<2 mg/L

Table 2. Recommended concentration limits for nutrients in irrigation water for greenhouse and nursery plants (NSW DPI, 2021; ANZECC & ARMCANZ, 2000; UC Cooperative Extension, 2009), Cassanti et al., 2012).