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Managing algae in water storages

The growth of algae in water storages can cause significant problems with pumping infrastructure by increasing the clogging of filters and emitters. Algae also reduce water quality by increasing pH levels, in turn reducing the effectiveness of water disinfestation treatments.

Algae are very small plants capable of growing very quickly in certain conditions. These rapid increases in algal populations, referred to as 'blooms', are most often seen as changes in colouration of the water, or as a scum on the water surface. Blue green algae are a specific type of bacteria called cyanobacteria, which behave similarly to green algae. Cyanobacteria are of particular concern to human health as they release toxins into the water as the cells die, and can cause liver or nerve damage if present in drinking water.

High water temperatures, low water levels and increasing nutrients (eutrophication) in water

Table 1: Algae species present in water storages (from *Managing Water in Plant Nurseries)*

Common name	Species
Filamentous green algae	*Cladophora* *Hydrodictyon* (water net) *Spirogyra*
Stoneworts	*Chara* *Nitella*
Blue-green algae	*Anacystis cyanea* *Anabaena circinalis*
Diatoms	*Navicula* *Cycotella* *Melorisa*
Euglenoids	*Euglena*

storages due to below average rainfall can be a trigger for the development of algal blooms. The main nutrients required for the growth of algae are carbon dioxide, nitrogen and phosphorous. Trace elements such as iron, copper and molybdenum may also be important. Fluctuating water temperatures can cause mixing of water layers in the dam, bringing nutrients from the lower layers to the surface. There can also be seasonal variations in algal blooms due to changes in temperature and light levels. Algal blooms are most common in spring when water temperatures and light levels increase, but can occur sporadically at any time during the warmer months.

Preventing algal blooms is better than trying to cure a bloom once it has occurred. Controlling the amount of nutrients in the water storage by reducing the amount of organic matter and nitrogen and phosphorous runoff, is the most effective method of managing algae. Blue-green algae are able to fix nitrogen from the air and reducing the availability of phosphorus is therefore the easier way of controlling these particular organisms.

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If excessive algal growth is an annual problem, determine the cause rather than treating the water each year. Test for levels of nitrogen and phosphorous in late winter/early spring to see if levels are high enough for algal growth, then look at possible sources of nutrients and methods they can be reduced by. Removal of unwanted plants in the storage can be a useful long-term strategy to remove nutrients from the system.

When filling a dam, remove all vegetation from below water level, and control run-off from direct sources of nutrients such as animals, septic tanks, disturbed soil and decaying vegetable matter. Detergents can be a significant source of phosphorous. The sediments in a water storage also contain nutrients, which can be released into the water when there are low levels of oxygen.

Aeration removes bottom sediments and breaks up water layers within the storage (stratification), increases dissolved oxygen levels, enables controlled removal of organic sediments and creates an environment unsuitable for algal growth. Aerators can be used in conjunction with a biological activator to enhance the breakdown of suspended solids, increase dissolved oxygen and lower the biological oxygen demand (BOD) and ammonia and nitrate levels.

Barley straw may inhibit the growth of algae, and is most useful when applied to dams as a preventative measure due to its slow mode of action, taking at least a month to become effective. 100 grams of straw spread on the surface per 1000 litres of stored water is required, and the effect lasts about six months.

Ferric alum applied at a rate of 100mg/L and applied by suspending the product in a bag in the water has been shown to reduce phosphorous levels by causing the phosphorus to settle out (precipitate).

As a last resort, chemical control can be achieved by the use of copper-based algaecides such as Coptrol and is applied by spraying the product over the water surface.

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