The control of algae

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CONDITIONS in areas of still, stored water in Western Australia can easily become ideal for the development of algae and control measures may become necessary in farm dams and swimming pools.

The recommendations made are based on information from various sources including the Director, Government Chemical Laboratories and officers of other Divisions of the Department of Agriculture.

Algae comprise a group of lesser developed plants which do not produce seeds but propagate both vegetatively and by spores. They may consist of a single cell, a chain of cells often referred to as a filament, or a more complex structure such as some sea weeds.

Small types of algae can be present in water without being apparent. However, under favourable conditions these are able to multiply and become troublesome in a relatively short time.

Algae are generally classified on colour, the blue-green and green algae being mainly involved with dams and swimming pools. Some stock losses in South Australia and Victoria have been attributed to these growing in shallow water.

In Western Australia, a blue-green algae reported as toxic in other parts of the world has been suspected of causing sheep losses in the Great Southern, and also deaths of wild fowl at Lake Monger and other lakes in the metropolitan area. The toxicity* of an algal sample taken from Lake Monger was confirmed by the Animal Division.

Algae can also be detrimental in other ways. Water becomes unpalatable, and unattractive in appearance, particularly when dead and decaying plants are present. The unpleasant smell of dead algae is well known to most people.

When pipes and pumps are involved, filamentous algae can readily cause blockages which necessitates frequent cleaning of screens.

Algal growth is stimulated by high levels of temperature, light intensity and nutrients in the water and rapid proliferation can be expected during summer when water temperatures may exceed 85° F. and light intensity is at its maximum. Both factors are accentuated with shallow water.

Factors which favour the growth of algae can be manipulated to help control them. Tanks can be covered to exclude light and reduce temperature, and measures can be taken to reduce the nutrient level of the water. Systems should be adopted to minimise fouling of dam water by stock, and fertiliser application should be restricted in the immediate catchment area. It is often more practicable to treat water following pumping to a covered storage tank, than to control algae in a large supply dam.

**Chemical control**

Some algae can be removed mechanically, but providing conditions remain favourable for growth, chemical treatment is usually necessary. Most algae in storage water can be killed by weak solutions of copper sulphate (bluestone), calcium hypochlorite (bleaching powder or chloride of lime), or simazine. The treatment should be carried out when algal development is first noticed.

The recommended concentration of copper sulphate is one part per million, equivalent to one pound per 100,000 gallons

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*This aspect is dealt with fully by T. E. H. Aplin in Department of Agriculture Bulletin 3540, Nov. 1967.*

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or one ounce per 6,000 gallons of water treated. The chemical should first be dissolved in warm water and then introduced as evenly as possible to the dam or tank. A convenient and effective method is to spray the solution on to the surface so that the copper sulphate mixes rapidly throughout the entire depth and does not form a heavy concentration near the bottom. The rate and degree of mixing can be improved by stirring the water in tanks with a long pole or, in the case of dams, dragging an object such as a tree branch through the water.

When applied to dams in the form of granules the amount of copper sulphate in solution is frequently lower than the theoretical amount, probably due to absorption by mud on the bottom. A heavy bloom of algae also appears to have the capacity to rapidly reduce the amount of copper sulphate in treated water. Under these conditions some increase in quantity may be necessary, particularly if the water is alkaline.

If the water is alkaline or contains suspended clay it is worth mixing an equal weight of citric acid with the copper sulphate to prevent precipitation of the copper.

At the level recommended, copper sulphate does not impair the quality of water for stock, irrigation or domestic purposes. Fish are likely to be affected but the risk is minimised by rapid mixing to avoid pockets of higher concentration.

Copper sulphate has a corrosive effect on metals, especially galvanised, and should be mixed in a glass, plastic or earthenware container. The final dilute solution is far less active chemically but, over a period, could affect metal, including pumps.

The amount of calcium hypochlorite necessary varies with the conditions, particularly the degree of algae infestation and the water temperature. A rate that is generally effective is two ounces of 70 per cent. material in 1,000 gallons of water. Correctly chlorinated water is safe for domestic purposes and stock, although a taste may be imparted to the water for a limited period.

Satisfactory results with filamentous algae have been obtained with a recently developed herbicide, simazine, marketed under the name of Gesatop 50. At the recommended rate of one pound of commercial product (50 per cent. simazine) to 25,000 gallons of water the chemical is not harmful to human beings, stock or fish.

Where practicable, algae should be removed mechanically, both before the chemical is applied and after it has taken effect. Dead algae readily putrify making the cure worse than the complaint, particularly if pipes become blocked.

**Swimming pools**

Calcium hypochlorite releases hypochlorous acid and chlorine and is used extensively for the chlorination of swimming pools. For maximum results, including the prevention of algae growth, the pH should be kept between 7.2 and 7.5 and the residual chlorine level within the range of 0.5-1.0 ppm. As sunshine reduces the period for which calcium hypochlorite remains effective, it should be applied in the evening.

Cyanuric acid is sometimes added as a stabiliser to increase the active period. Isocyanurates, which combine the properties of the two chemicals, are also used for the same purpose, often alternating with the hypochlorite.

Super-chlorination should be carried out at intervals, particularly during the summer, using three times the normal rate. If algae does appear, higher rates of calcium hypochlorite may be sustained, or alternative chemicals, including quaternary ammonia, used according to the suppliers instructions. The chlorine level should be allowed to fall to 1 ppm before swimming.

Although copper sulphate is used as an algicide for pools it may affect metal parts of the filter system.