



DOVE
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Information

Duckweed control

Duckweeds are not only difficult to eradicate, they just keep coming back. Although actively growing duckweeds are not difficult to clear from a pond, their rapid growth means that they can re-establish their populations from a few hidden or protected fronds before you know it. In addition, dormant submerged seeds and turions will germinate when conditions become optimal and along with this, water fowl will re-inoculate your water with duckweeds that cling to their feathers when they fly in from other places. Instead of getting rid of your duckweeds, think instead of how they are cleaning your water.

Diquat

This is a contact herbicide that immediately causes exposed plant tissues to turn brown and die. Results are noticeable within several days. Commonly available diquat products are Reglone and Waterloo. Diquat is effective in eliminating duckweeds and the general recommended application rate used in the US but not approved for use in the UK is one gallon per surface acre. In the US it is mixed with water at a 50:1 ratio and finely sprayed on top of the floating duckweeds. Effectiveness is greatly enhanced by adding nonionic surfactant to the mixture prior to application. Diquat allows for spot treatments of duckweeds and it is also recommended in the US that application is done when duckweeds have collected along one side of the pond. Finally, multiple applications about two weeks apart are typically needed to fully eliminate duckweeds. Survivors of the initial treatment can quickly reproduce and become a problem once more.

As duckweed plants are so small, a single Diquat treatment will seldom make contact with and kill all the plants. It also does not persist in the water and it is typically gone from the water column by 7 to 10 days after treatment. Therefore, any plants that survive the initial treatment will start to regrow in a few days. A typical scenario after treatment with Diquat is that many of the plants will turn brown and sink but the survivors will re-grow and again cover the pond. Effectiveness is also reduced in water with high levels of organic (peaty) matter.

Several treatments of Diquat usually have to be made in a single season to keep a pond relatively free of duckweed. Treatments should begin as soon as the plants start to grow in the spring or early summer in order to “keep ahead” of the growth. It is helpful to treat when the wind has pushed the plants to one end of the pond; the spray should be concentrated on the plants in that area. However, do not forget to spray small patches that may still be floating on other parts of the pond or washed up along the banks.

Clarasan

Clarasan is a granular herbicide for control of aquatic algae. For best results apply when algal growth active and before heavy infestations have built up. Control is more rapid in warm weather. Apply granules evenly across either from the bank using a machine with a long throw or through suitable equipment mounted on a boat. Granular formulation permits early application to avoid deoxygenation caused by dead or dying vegetation. Use only in static or sluggishly moving water. The flow in moving water should be stopped for at least 7 days after treatment otherwise weed control may be reduced. Treat small ponds before start of new growth, usually before end April. Algal growth ceases immediately but visible signs may not be obvious for 2-4 wks after treatment. Re-growth should not occur for at least 3-4 months.

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This is a granular product containing 1% of terbutryn as the active ingredient. This product will kill most submerged vegetation, although water lilies are not usually affected. The granules should be spread evenly over the water surface. Susceptible algae should be treated at an application rate of 5kg product per 1000 cubic metres of water. Moderately resistant algae should be treated at a rate of 10kg per 1000 cubic metres of water. The product should be applied early in the spring as soon as the water temperature reaches 10°C. Growth ceases almost immediately but signs of death only usually occur after 2-4 weeks.

If dense weed growth is present only use the product on 400 m long stretches of watercourse separated by at least 400 m of untreated section, and on not more than one quarter of the total area of a lake or pond. Leave 14 days before re-treating each remaining section. Clarosan acts by inhibiting photosynthesis (production of oxygen) but does not inhibit respiration (consumption of oxygen). Levels of dissolved oxygen in treated areas will fall dramatically after treatment and may cause harm to fish and other animals in the area. It is very important not to treat the entire watercourse at one time to allow fish and invertebrates to find unaffected areas. It is, however, important that the whole system is treated within a 6-8 week period otherwise control may be reduced. Clarosan is only effective in static water where the flow is less than 1 metre in 3 minutes (effectively static). If there is any observable water movement then the flow should be stopped for seven days. Water treated with this product may be used for irrigation and watering of livestock seven days after treatment.

Susceptible:

Cladophora glomerata

Enteromorpha intestinalis

Rhizoclonium species

Spirogyra species

Moderately resistant:

Vaucheria dichotoma

Dichlobenil

Dichlobenil products are granular formulations and can be used in all types of water body. The only species of algae controlled are *Chara* species. All other filamentous algae are resistant. These products are claimed to control most submerged rooted plants. Do not plant replacement plants within 4 months of treatment.

Azolla control

Azolla filiculoides is probably the only species of floating fern found in Britain, although there are some known observations of *A. caroliniana* but no herbarium specimens to check.

Herbicides are the most effective form of control. The floating fronds can be sprayed with either diquat or glyphosate. Glyphosate will kill almost all emergent and floating weeds onto which the spray is directed. Diquat (as Reglone) will burn off emergent and other floating weeds but will not kill them (except duckweeds). Surviving fronds may require a second or subsequent treatment if the weed is to be eliminated. This is best carried out when a gentle wind or currents have collected floating fronds together at suitable points. This plant can also be controlled by subsurface injection of diquat (as Reglone) or by an application of terbutryn granules (as Clarosan 1FG). Both of these herbicides will control other submerged weeds and algae. If spores have already been released in the current or previous year, it may be necessary to carry out repeated control operations until all the spores have germinated and been controlled. Herbicides should be applied before a complete surface cover has developed to increase effectiveness. If this is not possible a repeat application may be necessary to kill any surviving plants.

Azolla is very susceptible to the selective herbicide asulam (as Asulox) but the herbicide is not approved for use in water.

As a fern *Mogeton* is known to control algae and liverworts growing on the surface of container grown plants. Whilst being bright orange in colour it may be effective in controlling the ferns floating on the surface. It is not known to damage any higher plant material.

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Environmental, Health and Safety compliance.

Treating water courses, ponds and similar water bodies may require permissions from authorities. Some rivers require Environment Agency permission to apply a herbicide on the banks or in the river. Groundwater pollution regulations should also be checked to ensure applications of herbicides are compliant. Always fully read the label before you prepare for herbicide applications and ensure you comply with all the environmental and safety statements printed on it.

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Table 1. Response of common aquatic weeds to herbicides.

Aquatic Herbicides						
Aquatic group and weed	copper complexes copper sulfate	2,4-D	diquat	endothall	fluridone	glyphosate
Algae						
planktonic	E	P	P	P	P	P
filamentous	E	P	E	G ¹	P	P
chara	E	P	G	G ¹	P	P
nitella	E	P	G	G ¹	P	P
Floating Weeds						
bladderwort	P	G ²	E		E	
duckweeds	P	G ³	G	P	E	
water hyacinth	P	E	E		P	G
watermeal	P	P	P-F		F-G	
Emersed						
alders	P	E	F	P	P	E
alligatorweed	P	F	P	P	G	E
American lotus	P	E	P	P	F	G
arrowhead	P	E	G	G		E
buttonbush	P	E	F	P	P	G
cattails	P	G	G	P	F	E
fragrant and white waterlily	P	E	P		E	E
frogbit	P	E	E			
maidencane	P	P	F		F	E
pickerelweed	P	G	G		P	F
pond edge annuals	P		G	P	F	E
sedges and rushes	P	F	F		P	G
slender spikerush	P		G		G	P
smartweed	P	E	F		F	E
spatterdock	P	E	P		E	G-E
southern watergrass	P	P			G	
torpedograss	P	P	P		F	G
watershield	P	E	P	P	G	G
water pennywort	P	G	G		P	G
water primrose	P	E	F	P	F	E
willows	P	E	F		P	E
Submersed Weeds						
broadleaf water-milfoil	P		E	E	E	P
coontail	P	G	E	E	E	P
egeria	P	P	G	F	E	P
elodea	P		E	F	E	P
eurasian water-milfoil	P	E	E	E	E	P
fanwort	P	F	G	E	E	P
hydrilla	F ⁴	P	G	G	E	P
naiads	P	F	E	E	E	P
parrotfeather	P	E	E	E		F
pondweeds (Potamogeton)	P	P	G	E	E	P

E = excellent control; G = good control; F = fair control; P = poor control
¹Hydrothol formulations only.
²Granular 2,4-D formulations.
³Liquid ester formulations only.
⁴Copper complexes.

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