

## AQUATIC WEED CONTROL IN IRRIGATION WATER SUPPLIES

Jack M. Whetstone

Department of Forestry and Natural Resources

Aquatic weeds in ponds or lakes used as sources for irrigation water can be controlled by physical removal, biological control, or herbicides. The method, or combination of methods, used will depend on factors such as target weeds, non target plants, and what the water is used to irrigate. Physical removal can be accomplished manually or with machinery. It is time consuming, expensive and normally used alone if other methods are not feasible. However, a certain amount of physical removal may be necessary in combination with the use of biological control and herbicides.

Biological control is an option for certain aquatic weeds. The major advantages are ease of application and no concern over damage to plants irrigated with treated water. Triploid grass carp can control many submerged vascular aquatic weeds. Grass carp are usually used to control all vegetation in a pond, rather than selectively controlling certain vegetation. Replacement stocking of grass carp is necessary when fish are lost. A permit is required to stock grass carp, and only triploid fish can be legally used in SC. Tilapia are stocked in the spring and control most algae species. The concern with tilapia is that they are tropical animals and usually die during cold winters thereby requiring an annual stocking. Tilapia are legal for use in SC. The South Carolina Department of Natural Resources (SC DNR) now requires a free of charge permit prior to stocking tilapia and triploid grass carp for aquatic weed control in SC. A permit can be obtained from SC DNR at 803-734-3891 or from registered dealers in SC. The short permit can be FAXed (803-734-4748) for a rapid turn around. Check with your Department of Natural Resources to determine if grass carp and tilapia are legal to stock and if a permit is required in your state.

Diquat, endothall, glyphosate, fluridone, triclopyr, copper, sodium carbonate Peroxyhydrate, 2,4-D, carfentrazone, imazapyr and penoxsulam compounds can be used safely in ponds used as irrigation sources if the manufacturer's label directions are followed. Certain waiting periods may be required before using water for irrigation after the herbicide is applied, while in some cases waiting periods are not required. Various chemicals have different product formulations; only aquatic labeled pesticides and surfactants/adjuvants may be used in aquatic applications, by law. **Labels change frequently; refer to the current herbicide label for specific application information. Never exceed the rates recommended on label of the specific product applied. The label is the law.**

### Amount of Formulation for Application

Herbicide	Rate*
Aquathol	0.3 to 2.6 gal/acre foot of 4.2 L or 13 to 108 lb of 10G/acre foot or 2.2 to 22.0 lb of 63G/acre foot.
Hydrothol	0.3 to 3.4 gal/acre foot of 2L or 11 to 136 lb of 11G/acre foot.
Diquat	1 to 2 gal/surface acre of 2L.
2,4-D	1 to 2 gal/surface acre of 3.8 L or 150 to 200 lb of 20G/surface acre.
Copper Compounds	0.6 to 3.4 gal of Chelated Copper/acre foot or 0.1 to 0.5 ppm elemental copper.
Fluridone	0.25 to 0.5 gal/surface acre. Check with Company rep for exact rates.
Glyphosate	4.5 to 7.5 pt/surface acre of 5.4L.
Triclopyr	2 to 8 quarts per surface acre of 3L.
Sodium Carbonate Peroxyhydrate	3 to 170 pounds per acre-foot of 50G.
Imazapyr	2 to 6 pints per acre.
Carfentrazone	3.4 to 13.5 fl. oz. per surface acre for floating vegetation - 0.286 gal/acre foot for submerged vegetation.
Penoxsulam	10 to 150 ppb Not to exceed 150 ppb per growing season. Follow label for specific rates.

1 Acre foot = 1 surface acre of water (43,560 ft<sup>2</sup>) 1 foot deep.

**EFFECTIVENESS OF HERBICIDES FOR AQUATIC WEED CONTROL**

Weed	Copper complexes, copper sulfate	2,4-D	Diquat (Reward)	Endothall		Fluridone	Glyphosate	Sodium Carbonate Peroxyhydrate	Triclopyr	Imazapyr	Carfentrazone	Penoxsulam
				Aquathol K & G	Hydrothol G & 191							
<b>ALGAE</b>												
Filamentous	E	P	P	-	G	P	P	E	-	-	-	-
Planktonic	E	P	G	-	G	P	P	E	-	-	-	-
Branched (Chara)	E	P	G	-	G	P	P	P	-	-	-	-
Nitella	E	P	G	-	G	P	P	P	-	-	-	-
<b>FLOATING PLANTS</b>												
Bladderwort	P	P	E	-	-	E	-	P	-	-	-	-
Duckweeds	P	G <sup>1</sup>	G	P	P	E	P	P	-	E	E	E
Water hyacinth	P	E	E	-	-	P	G	P	E	E	E	E
Watermeal	P	P	P	-	-	G	P	P	-	-	G	G
<b>SUBMERSED PLANTS</b>												
Broadleaf watermilfoil	P	-	E	E	E	E	P	P	E	-	G	E
Coontail	P	G	E	E	E	E	P	P	-	-	-	-
Egeria	P	P	G	F	F	E	P	P	-	-	-	E
Elodea	P	-	E	F	F	E	P	P	-	-	-	E
Eurasian watermilfoil	P	E	E	E	E	E	P	P	E	-	E	E
Fanwort	P	F	G	E	E	E	P	P	-	-	-	-
Hydrilla	F <sup>2</sup>	P	G	G	G	E	P	P	-	-	-	E
Naiads	P	F	E	E	E	E	P	P	-	-	-	G
Parrotfeather	P	E	E	E	E	-	F	P	F	E	E	G
Pondweeds (Potamogeton)	P	P	G	E	E	E	P	P	-	-	-	E
<b>EMERGENT PLANTS</b>												
Alders	P	E	F	P	P	P	E	P	-	-	-	-
Alligatorweed	P	F	P	P	P	G	E	P	E	E	G	G
American lotus	P	E	P	P	P	F	G	P	E	E	-	-
Arrowhead	P	E	G	G	G	--	E	P	-	E	-	G
Buttonbush	P	E	F	P	P	P	G	P	-	E	-	-
Cattails	P	G	G	P	P	F	E	P	-	E	-	-
Common reed	P	P	P	P	P	P	G	P	-	E	-	-
Fragrant & white waterlily	P	E	P	P	P	E	E	P	E	E	-	-
Frogbit	P	E	E	--	--	--	--	P	E	E	-	-

**EFFECTIVENESS OF HERBICIDES FOR AQUATIC WEED CONTROL**

Weed	Copper complexes, copper sulfate	2,4-D	Diquat (Reward)	Endothal		Fluridone	Glyphosate	Sodium Carbonate Peroxyhydrate	Triclopyr	Imazapyr	Carfentrazone	Penoxsulam
				Aquathol K & G	Hydrothol G & 191							
Maidencane	P	P	F	-	-	F	E	P	-	E	-	-
Most grasses	P	P	P	P	P	P	G	P	-	E	-	-
Pickereelweed	P	G	G	--	--	P	F	P	E	E	-	G
Pond edge annuals	P	-	G	-	-	E	E	P	-	E	-	-
Rush	P	P	F	P	P	F	E	P	-	E	-	-
Sedges and rushes	P	F	F	P	P	P	G	P	-	E	-	-
Slender spikerush	P	-	G	-	-	G	P	P	-	-	-	G
Smartweed	P	E	F	-	-	F	E	P	E	E	-	G
Spatterdock	P	E	P	P	P	E	G-E	P	E	E	-	-
Southern watergrass	P	P	-	-	-	G	E	P	-	-	-	-
Torpedograss	P	P	P	-	-	F	G	P	-	E	-	-
Watershield	P	E	P	-	-	G	G	P	-	-	-	-
Water pennywort	P	G	G	P	P	P	G	P	E	E	-	E
Water primrose	P	E	F	-	-	F	E	P	E	E	G	-
Willows	P	E	F	P	P	P	E	P	-	E	-	-

E=excellent control (90 to 100%); G=good control (80 to 89%); F=fair control (70 to 79%); P=poor control (<70%). A blank space indicates weed response is not known.

<sup>1</sup>Ester formulations only.

<sup>2</sup>Copper complex only.

For more information on aquatic weed identification and control, these internet sites are recommended:

<http://aquaplant.tamu.edu/>

<http://aquat1.ifas.ufl.edu/welcome.html>

<http://el.erdc.usace.army.mil/aqua/apis/apishelp.htm>

**WAITING PERIOD (DAYS) BEFORE USING WATER AFTER APPLICATION OF HERBICIDES FOR AQUATIC WEED CONTROL**

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Common Name	Trade Name	Irrigation	Fish Consumption	Watering Livestock	Swimming
<b>Copper</b>	Crystalline copper sulfate and various liquid organic copper complexes	NR <sup>1</sup>	NR	NR	NR
<b>2,4-D</b>	Various formulations and manufacturers <sup>2</sup>	Water use restrictions vary by formulation and manufacturer. Certain labels allow irrigation if an approved chemical assay has reached acceptable levels. A few labels allow irrigation with specific waiting periods. Certain labels <u>may</u> allow irrigation on established turf, immediately. CHECK INDIVIDUAL LABEL.			
<b>Diquat</b>	Reward	1 to 3 <sup>3</sup>	NR	1	NR
	Weedtrine D	5	NR	5	NR
<b>Endothal</b>	Aquathol K	7 to 25	NR	7 to 25	NR
	Aquathol granular	7 to 25	NR	7 to 25	NR
	Aquathol Super K	7 to 25	NR	7 to 25	NR
	Hydrothol 191	7 to 25	NR	7 to 25	NR
	Hydrothol 191 granular	7 to 25	NR	7 to 25	NR
<b>Fluridone</b>	Avast, Sonar AS, Sonar SRP, Sonar PR, Sonar Q	7-30+	NR	NR	NR
<b>Glyphosate</b>	Rodeo, AquaNeat, AquaMaster, AquaPro	NR	NR	NR	NR
<b>Sodium Carbonate Peroxyhydrate</b>	Green Clean, Pak 27, Phycomycin	NR	NR	NR	NR
<b>Triclopyr</b>	Renovate	120 <sup>4</sup>		NR <sup>5</sup>	NR
<b>Imazapyr</b>	Habitat	120	NR	NR	NR
<b>Carfentrazone</b>	Stingray	0-14 <sup>6</sup>	0	0 to 1	0
<b>Penoxsulam</b>	Galleon	<30 ppb Turf <1 ppb Others	NR	NR	NR

<sup>1</sup>NR = No restrictions.

<sup>2</sup>Most formulations do not permit application to ponds used for irrigation or for watering dairy cattle.

<sup>3</sup>Three days for irrigation of turf and nonfood crops; five days for irrigation of food crops (including tobacco) or for preparation of agricultural sprays.

<sup>4</sup>No restriction for established grasses and assay to reduce restriction time.

<sup>5</sup>14 day restriction on grazing site and growing. Season grazing restriction on lactating livestock after irrigating pasture.

<sup>6</sup>1 day if <20% of surface acreage is treated. 14 days if >than 20% is treated. Certified lab test of <5 ppb.