



## Aquatic Plant Identification and Management Workbook, Series 1

The Aquatic Plant Identification and Management Workbook Series is designed to acquaint pond owners in Maryland with naturally-growing aquatic plants and the general means for managing their growth. Aquatic plants play an important role in the natural ecology of ponds: they provide food and shelter for many fish, aquatic animals and other wildlife, and they provide oxygen, which can benefit fish production.

Sometimes, however, growth gets out of hand and the plants become so numerous they interfere with the intended

use of the pond, for example, fishing, swimming, boating—they are then called aquatic weeds. When this occurs, control measures often become necessary.

The suggested chemical controls in this workbook are intended as guidelines and must not replace directions on chemical labels. A separate fact sheet, in color, displays each of the aquatic plants in this series and is available from the Maryland Sea Grant Extension Program or your local Cooperative Extension Office.

### SUBMERGENT VEGETATION

# Sago Pondweed

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**V**ascular flowering aquatic plants are seed-bearing and are characterized by a system of conductive and supportive tissue. They can be classified into several broad categories of vegetation: floating, submergent, emergent and terrestrial. This workbook focuses on sago pondweed, a submergent plant.

Submergent plants are underwater plants usually found in deeper waters. Completely submerged, they are usually rooted to the bottom, lack rigid cell structures (making them appear limp), and often grow up to the water surface. Flowers, when present, often extend above the water surface in spikes.

#### SAGO PONDWEED (*Potamogeton pectinatus*)

Sago pondweed is found in fresh to moderately brackish water. It is usually slow moving or standing waters and is generally not very competitive when there are other plants in the pond. Heavy concentrations of sago pondweed can interfere with boat traffic and hinder fishing. Most of the *Potamogetons* produce fruits, tubers

and roots, which are good sources of food for waterfowl. Sago pondweed is an excellent example. In some areas this plant is intentionally planted for waterfowl habitat enhancement.

#### IDENTIFICATION

*Potamogetons*, better known as pondweeds, are the most abundant group of perennial aquatic seed plants and are found in freshwater usually high in calcium, or in moderately brackish waters. Many have leaves that float on the surface; others are completely submerged except for the flowering spikes. However, sago pondweed is a wholly submerged plant with no floating leaves. The leaves are entire and filiform (long and slender). Originating at the end of a sheath, they taper to a narrow point and have one to three nerves with numerous strong cross-veins. The plant develops from a thickly matted rhizome system which can bear terminal tuberous bulbs. The flower is a spike, greenish in color,



Karen Teramura

Submergent Vegetation: Sago Pondweed.

with several whorls that are unequally spaced. The fruit is a plump nutlet and the beak is very short. Flowers are present June-September. Reproduction is by tubers, seeds, or daughter plants arising from the rhizomes.

#### CONTROL

When chemicals are used to control aquatic vegetation, certain precautions must be followed.

**CHEMICAL CONTROL.** The following is a table of chemicals labeled to treat sago pondweed. The table was compiled from information gathered from the aquatic chemical industry. *Inclusion in the table does not imply endorsement by the University of Maryland nor by the authors.* Omission of chemicals is a result of oversight on the authors part or of new label registration. The table is for comparison purposes only and is not intended to replace the chemical label. Labels are subject to change; therefore, always check the label for treatment sites, rates, and precautions before purchasing or applying any chemical. **Do not use the table for treating aquatic plant problems.**

<b>Sago Pondweed</b>				
<b>Chemical Name</b>	<b>Chemical Type</b>	<b>Application</b>	<b>Restriction Periods</b>	<b>Comments</b>
Weed Boomer	Diquat dibromide	8 gal/acre	livestock watering, spraying, irrigation—10 days, drinking—14 days	do not use in muddy water
Hydrothol 191	Mono salt of endothal	27-136 lb/acre ft (0.5-2.5 ppm concentration)	do not use water for irrigation use fish—3 days	toxic to fish (0.3 ppm)
Aquathol	Dipotassium salt of endothal	use 2.0-3.0 ppm concentration 2.0 ppm=215 lb/acre 3.0 ppm=323 lb/acre	irrigation, spraying drinking—7 days, use fish—3 days, swim—24 hours	
Sonar A.S.	Fluridone	depth <3 ft 0.5-0.75 qt/acre 3-5 ft 0.75-1.0 qt/acre >5 ft 1.0-1.5 qt/acre	irrigate established tree crops —7 days, new crops and turf—30 days	do not use in tidewater or brackish water or where crayfish are farmed
Sonar 5P	Fluridone	depth <3 ft 10-15 lb/acre 3-5 ft 15-20 lb/acre >5 ft 20-30 lb/acre	irrigate established tree crops —7 days, new crops and turf—30 days	do not use in tidewater or brackish water or where crayfish are farmed
Diquat Herbicide-H/A	Diquat dibromide	1-2 gal/acre irrigation, drinking—14 days	livestock watering, spraying,	do not use in muddy water
Norkem 500	Diquat dibromide	20-40 gal/acre irrigation, drinking—14 days	livestock watering, spraying,	do not use in muddy water
Ultimate	Diquat dibromide	10-20 gal/acre irrigation, drinking—14 days	livestock watering, spraying,	do not use in muddy water
Watrol	Diquat dibromide	48 gal/acre irrigation, drinking—14 days	livestock watering, spraying,	do not use in muddy water
Sentry	Diquat dibromide	Depth 1 ft 7-14 gal/acre 3 ft 21-42 gal/acre 5 ft 35-70 gal/acre	livestock watering, spraying, irrigation, drinking—14 days	do not use in muddy water
912 Aquatic Weed killer	Diquat dibromide	20 gal/acre	swimming, spraying, irrigation,	do not use in muddy water drinking—14 days
Aquaquat	Diquat dibromide	1/4-1/2 ppm cation, dilute 10:1 w/water	livestock watering, spraying, irrigation, drinking—14 days	do not use in muddy water water
Weedtrine-D	Diquat dibromide	5-10 gal/acre	livestock watering, spraying, irrigation, drinking—14 days	do not use in muddy water
Aquashade	Acid Blue 9 Acid Yellow 23	1 gal/4 acre ft	no swimming until after dispersal, do not use water for human consumption	
Aquazine	Simazine	3.4-6.8 lb/acre ft	irrigation, spraying, drinking—12 months	do not apply more than 10 lb/acre where striped bass fry or fingerlings will be cultured immediately
Aquathol K	Dipotassium salt of endothal	1.0-2.0 ppm concentration level 4 ft 2.6 gal 1.0 ppm 5.1 gal 2.0 ppm	livestock watering, spraying, irrigation, drinking—14 days, use fish—3 days, swim—24 hours	
Kocide Copper Sulfate Pentahydrate Crystals	Copper sulfate	1.6-2.4 lb/per cubic ft pentahydrate 99%	concentration cannot exceed per second per day	may be toxic to fish 1 ppm if water is used as a potable source

Chemical Name	Chemical Type	Application	Restriction Periods	Comments
Norosac 10G	Dichlobenil	100-150 lb/acre	do not use water for irrigation, livestock watering, or drinking, use fish—90 days	do not use in commercial fish or shellfish waters
Casoron 10G	Dichlobenil	100-150 lb/acre	do not use for irrigation, livestock watering, or drinking, use fish—90 days	do not use in commercial fish or shellfish waters

Always read the label and follow the directions. It is best to spot treat areas where the sago pondweeds are first sighted instead of waiting until they take over a pond completely. Determine the water uses and any use restrictions associated with the chemical control. Obtain all of the necessary permits. Make sure that you have properly identified the aquatic plant and have chosen the correct chemical control. Mix and apply the chemical according to the label directions. Keep the necessary records—they are required by law. Finally, monitor the water for dissolved oxygen and pH shifts after treatment to determine the effectiveness of the treatment and whether any fish kill occurs. Heavy plant die-off can cause oxygen depletion, while heavy growth can cause pH shifts on a daily cycle.

#### REFERENCES AND FURTHER READING

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**NOTE:** Because of the ecological role and sensitivity of aquatic vegetation, as well as Baywide efforts to restore this important resource, the state does not permit the use of chemical control in tidal waters, and greatly restricts their use in nontidal, flowing waters. Acquaint yourself with all regulations governing plant control activities, and obtain all necessary permits. Non-chemical means should be utilized where practicable.

#### FOR FURTHER INFORMATION

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