COOPERATIVE EXTENSION SERVICE • Maryland Institute for Agriculture & Natural Resources
Maryland Sea Grant Extension Program

Aquatic Plant Identification and Management Workbook, *Series 2*

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 list of fact sheets describing a variety of aquatic plants and their management is available from the Maryland Sea Grant Extension Program or your local Cooperative Extension Office.

SUBMERSED VEGETATION

Hydrilla

Reginal M. Harrell and John N. Hochheimer
Maryland Sea Grant Extension

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 and aquatic animals, 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 series are intended as guidelines and must not replace directions on chemical labels. Separate fact sheets display each of the aquatic plants in this series and are available from the Maryland Sea Grant Extension Program or your local Cooperative Extension Office.

INTRODUCTION

Vascular 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, submersed, emergent and terrestrial. This workbook series focuses on hydrilla, a submersed plant.

Betty Mack Wilson

Submersed Vegetation: Hydrilla

Submersed plants are underwater vegetation 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.

HYDRILLA
(*Hydrilla verticellata*)

Hydrilla is an introduced plant in Maryland and is therefore considered an exotic species. In fact, the plant is not native to the United States and may have been introduced from southeast Asia through the aquarium trade. The plant is a perennial herb with slender, branching stems forming loose, often impenetrable mats. It is extremely competitive with other plants and can grow in water as deep as 36 feet. In Maryland, it was originally detected in 1982, and since has become one of the major aquatic plant species in the tidal freshwater portions of the Potomac River. Because of its tenacity and varied means of reproduction, it has been considered a noxious plant in many states.

CHEMICAL CONTROL. The following is a table of chemicals labeled to treat hydrilla. 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. Do not use the table for treating aquatic plant problems.

Hydrilla

Chemical Name	Chemical Type	Application	Restrictions	Comments
Aquathol K	Dipotassium salt of endothall	2.0-3.0 ppm concentration 4 ft deep 2.0 ppm 5.1 gal/acre 3.0 ppm 7.7 gal/acre	livestock watering, spraying, irrigation, drinking-14 days use fish-3 days swimming-24 hours	
Komeen	Copper 8%	8-16 gal/acre	10-14 days between treatments	may be toxic to fish
Cutrine-Plus	Copper 3.7%	0.4-1.0 ppm		may be toxic to fish (trout especially)
Diquat Herbicide-H/A	Diquat dibromide	2 gal/acre	livestock watering, spraying, irrigation, drinking-14 days	do not use in muddy water
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
Sonar SRP	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

Because of its food value for diving ducks and coots, hydrilla has been recognized as contributing to an increase in waterfowl and fisheries in the Potomac River. In general, however, it has been reported as having minimal wildlife food value. Dense infestations of the plant are reportedly responsible for overpopulation of small forage fish and stunted largemouth bass populations.

IDENTIFICATION

Hydrilla is usually found in freshwater lakes, rivers and streams. It thrives under conditions such as acidic or alkaline waters, waters with high or low nutrients, and shallow or deep waters. There are reports that the plant lives in salinities as high as 9 parts per thousand, so it should not dominate the majority of the Chesapeake Bay. It is found in muddy substrates and tolerates low levels of sunlight. Growth is rapid and starts early in the morning at low sunlight levels. The canopy of hydrilla can become so dense that it shades out other aquatic vegetation, often out competing plants for space and nutrients.

Hydrilla is often confused with other water plants, such as elodea, because both have lance-shaped whorled leaves. However, only hydrilla has leaf margins that are toothed (serrated), which can be in whorls of three to five; elodea is found only in whorls of three and has smooth leaf edges. Hydrilla also has prominent red veins and spines on the underside of the midrib, which gives the plant a brittle, coarse texture when drawn through your hand. Elodea lacks this midrib and feels smooth to the touch when drawn through your hand in the same manner.

Hydrilla can reproduce by fragmentation, seeds, turions (resting buds), rhizomes and tubers found at the ends of rhizomes. The hydrilla plants in Maryland are monoecious (which means both male and female flowers are found on the same plant), while hydrilla in other locations is dioecious. Being monoecious increases the plant's ability to reproduce by seeds, although seed set is not usually as effective as vegetative reproduction. The small white female flowers are inconspicuous and found at the water's surface. The mid-to-late summer blooming flower has three petals.

The turions are known as winter buds which form at the leaf axils or stem tips. These buds break off and sink to the bottom, where they form new plants. The rhizomes spread out along the bottom of the plant or beneath the bottom, and can produce new stems which grow toward the water surface. Tubers are another type of resting bud which develop at the ends of the buried rhizomes and can form new plants. The tubers and turions allow the plant to survive over winter in Maryland and produce new plants in the spring.

CONTROL

When chemicals are used to control aquatic vegetation, certain precautions must be followed. Always read the label and follow the directions. It is best to spot treat areas where the hydrilla is first sighted instead of waiting until it takes 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 record — it is 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 kills occur. Heavy plant die-off can cause oxygen depletion while heavy growth can cause pH shifts on a daily cycle.

REFERENCES AND FURTHER READING

Harrell, R. M. and J. N. Hochheimer. 1985. Aquatic Vegetation Control. Fact Sheet 415, University of Maryland Cooperative Extension Program.

Hurley, L.M. 1990. Field guide to the submerged aquatic vegetation of Chesapeake Bay. U.S. Fish and Wildlife Service Chesapeake Bay Estuary Program, Annapolis, MD.

Lorenzi, H.J. and L.S. Jeffery. 1987. Weeds of the United States and their control. An AVI Book, Van Nostrand Reinhold Company, New York.

Traver, D.P., J.A. Rodgers, M.J. Mahler, and R.L. Lazor. 1978. Aquatic and wetland plants of Florida. Bureau of Aquatic Plant Research and Control, Florida Department of Natural Resources, Tallahassee.

Wellborn, T.L. 1984. Hydrilla Verticellata. Aquatic weed identification and control. Mississippi State University Cooperative Extension Service Information Sheet Number 1034, Mississippi State.

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.

Issued in furtherance of Cooperative extension work, acts of May 8 and June 30, 1914, in cooperation with the U.S. Department of Agriculture, University of Maryland, and local governments. Craig S. Oliver, Director of Cooperative Extension Service, University of Maryland System.