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

Bushy Pondweed

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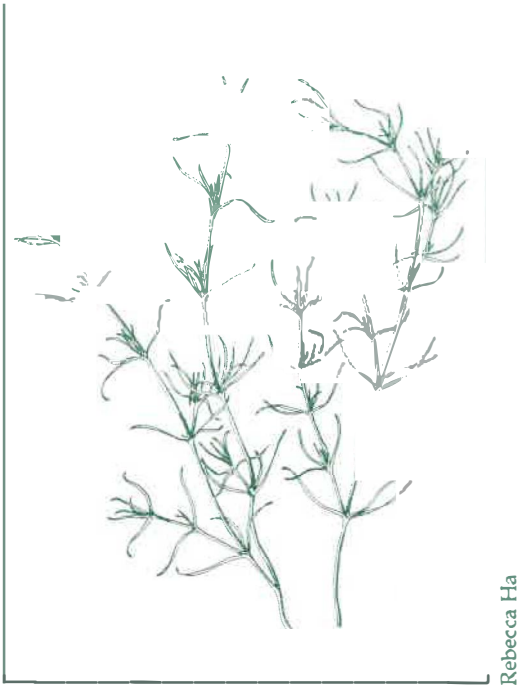
INTRODUCTION

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 bushy pondweed, a submersed plant.

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.



Rebecca Ha

Submersed Vegetation: Bushy Pondweed

BUSHY PONDWEED (*Naiads*)

Bushy pondweeds (*Najas* spp.) are rooted annual slender plants with branching stems. There are four species of the bushy pondweeds, or naiads as they are otherwise known, in Maryland. These four species include Southern naiad, or the plant most commonly known as bushy pondweed (*N. guadalupensis*); *N. minor* which has no common name; Northern naiad (*N. flexilis*); and slender naiad (*N.*

CHEMICAL CONTROL. The following is a table of chemicals labeled to treat bushy pondweeds. 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.

Naiads

Chemical Name	Chemical Type	Application	Restriction	Comments
Norossc 10G	Dichlobenil	100-150 lb/acre	do not use water for livestock watering, irrigation, humans use fish-90 days	do not use in commercial fish or shellfishwaters
Aquazine	Simazine	3.4-6.8 lb/acre	irrigation, livestock watering, spraying-12 months	do not apply more than 10 lb where striped bass fry or fingerling are to be cultured immediately
Komeen (Southern Naiad)	Copper 8%	6-12 gal/acre	10-14 days between treatments	may be toxic to fish
Weedtrine-D	Diquat dibromide	5 gal/acre	irrigation, spraying, livestock watering-14 days	do not use in mudddy water
Aquaquat	Diquat dibromide	1.5-2.5 ppm Dilute 10:1 with water	irrigation, spraying, livestock watering-14 days	do not use in muddy water
912 Aquatic Weed Killer	Diquat dibromide	10 gal/acre	livestock watering, swimming, spraying, irrigation-10 days drinking-14 days	do not use in muddy water
Sentry	Diquat dibromide	7 gal for every foot of depth up to 5 ft	livestock watering, spraying, irrigation-14 days	do not use in muddy water
Watrol	Diquat dibromide	48 gal/acre	livestock watering, swimming, spraying, irrigation-14 days	do not use in muddy water
Ultimate	Diquat dibromide	10 gal/acre	livestock watering, swimming, spraying, irrigation-14 days drinking-24 days	do not use in muddy water
Norkem 500	Diquat dibromide	20 gal/acre	livestock watering, spraying, irrigation-14 days	do not use in muddy water
Diquat Herbicide-H/A	Diquat dibromide	1 gal/acre	livestock watering, spraying, irrigation-14 days	do not use in muddy water
Aquacide Max 4 lb/1000 sq ft	Sodium 2,4-D spraying, irrigaton, drinking	2.5 lb/1000 sq ft	do not use water for muddy water	do not use in
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

Chemical Name	Chemical Type	Application	Restriction	Comments
Hydrothol 191	Mono salt of endothall	27-136 lb/acre ft (0.5-2.5 ppm)	do not use water for irrigation use fish-3 days	toxic to fish at 0.3 ppm concentrations
Aquashade (Slender Naiad)	Acid Blue 9 Acid Yellow 23	1 gal/4 acre ft	do not swim until after dispersal do not use water for human consumption	
Casoron 10G	Dichlobenil	100-150 lb/acre	do not use water for irrigation, livestock watering, drinking use fish-90 days	do not use in commercial fish or shellfish waters

gracillima) which is rare in Maryland. There is a marine naiad (*N. marina*), but it has not yet been reported in the state.

In general the plants are found in ponds, lakes and sluggish freshwater to slightly brackish streams which are fairly alkaline. However, they can tolerate a wide range of both chemical and physical conditions. They can be very abundant in shallow water and become a problem in commercial and sport fish ponds by forming thick mats which inhibit fish, water and boat movement. The plant is usually associated with sandy bottoms but can be found in muddy areas.

With the exception of slender naiad (*N. gracillima*), most of the bushy pondweeds are excellent food for waterfowl, in particular, mallards, lesser scaup, and pintails. All the plant parts (stems, leaves and seeds) are all edible.

IDENTIFICATION

As stated, all the plants are rooted annuals which have branching stems, and can range in height from one-inch high tufts to 6 feet. Coloration ranges from olive green to reddish. The stems are slender and the leaves are narrow (0.4 to 0.8 inches long and 0.02 to 0.03 inches wide, with fine spines), and broaden at the base. The leaves are opposite or whorled (in groups of 3). Reproduction is by fragmentation or seeds found in the leaf axils during late summer. Both male and female flowers are found in the leaf axils.

The individual species can be identified by the spines (serrations) on the leaf edges, and base, or by the markings on the seeds. The serrations and markings are sometimes so small that a hand lens is needed for proper identification.

The leaves of Northern naiad (*N. flexilis*) and bushy pondweed (*N. guadalupensis*) are wider than the other two species, and the bases are rounded near the stem. Northern naiad has leaves that usually curve outward from the stem and a dull skin covering a shiny seed. Bushy pondweed's leaves are flat and straight, and the seeds are a dull yellowish color with 10 to 20 rows of minute splotches.

Slender naiad (*N. gracillima*) has leaves that also curve out from the stem but are more slender than the two previously mentioned plants. Slender naiad also has a wide-topped leaf base, and dull seeds. The teeth on slender naiad are very fine and difficult to see without magnification.

In contrast, Najas minor also has leaves that curve outward but the teeth or serrations on the leaf margins are visible to the naked eye. The seeds of Najas minor have 12 to 18 longitudinal ribs on the seedcoat.

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 bushy pondweed 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

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