



Aquatic Plant Identification and Management Workbook, Series 4

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 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.

EMERGENT VEGETATION

Willows

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Vascular flowering aquatic plants are seedbearing 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 fact sheet focuses on willows, a group of emergent woody plants.

As a group, emergent plants are usually found rooted in shallow waters and all or part of the plant extends above the water line or hydrated soil. Some plants are not truly aquatic, and may be found in dry fields completely removed from a water source. The plants are usually rooted to the bottom of a pond, have a rigid cell structure, and are not dependent on the water column for support.

WILLOWS

(*Salix* spp.)

Willows are fairly recognizable by almost everyone. They are very fast growing deciduous shrubs or

trees that can grow as high as 100 feet tall. Far from being a commonly perceived nuisance aquatic plant, willows exhibit grace, grandeur, and beauty, and many pond and stream owners encourage them to grow. However, if allowed to go unchecked, willows can form dense thickets that make access to the body of water in question difficult. In addition, while they provide nice shade from the hot sun during summer, they also provide ample habitat in which fishing lines can get tangled.

Willows also have a very extensive root system that can cause a tremendous problem in pond bank maintenance. The roots provide a conduit for water within a pond to channel itself through the dam causing constant seepage. If the root system is extensive enough, pond seep-



Emergent Vegetation: Willows

age may become cost prohibitive in keeping the pond filled. If older trees die or are killed, the roots will eventually rot out and act as pipes for the pond water to funnel through the dam, ultimately resulting in compromising the dam's integrity.

Regarding the value of willows, the wood has been used to make fine grades of charcoal and lumber products such as boxes. The bark has a high yield of tannic acid and

Credit: B.T. Batsford Ltd, London, England

the brachlets are used for making rattan furniture or baskets. The early growth shoots, twigs, and buds are fed upon by song birds, gamebirds, and deer. Muskrat, beavers, rabbits, and squirrels feed on the bark, buds, and woody portions. The plant also provides protective shelter and roosting sites for various wading birds. The nectar is also a favorite among honeybees.

IDENTIFICATION

Being deciduous, the willows lose their leaves during the fall and winter, but during the spring and summer they have large, simple, alternate leaves that are lance-shaped and up to six inches long with finely toothed margins. The plant is dioecious, having separate male and female plants. The male (staminate) flowers are small with no showy parts and are found on erect cylin-

dricat catkins (a spike-like flower arrangement that has no petals). The female (pistillate) flowers are also small catkins that usually droop.

The fruit is an oval cone-shaped capsule about 1/2 inch long. It contains numerous fine, minute, hairy seeds. There is some cross pollination with the swamp willow (*S. caroliniana*) and the black willow (*S. nigra*) where their ranges overlap. In general, the mature leaves of the swamp willow are whitish-waxy below, with rounded bases, and yellowish glands on the tips of the angles of the leaf margin teeth. Leaves of the black willow are usually green, and only occasionally waxy below. They have tapering bases and reddish glands on the tips or angles of the leaf margin teeth. Reproduction of willows is by seeds.

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 willows are first sighted or wait until spring or summer when the plant is in bloom. Determine the water uses and any use restrictions associated with the chemical control.

Obtain all necessary permits. Make sure 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

CHEMICAL CONTROL. The following is a table of chemicals labeled to treat willows. 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.**

Willow (<i>Salix</i> spp.)				
Chemical Name	Chemical Type	Application	Restriction	Comments
912 Aquatic Weed Killer	Diquat dibromide	1 pint in 100 gal water as a top dressing	livestock watering, spraying, irrigation, swimming – 10 days drinking – 14 days	do not use in muddy water
Sonar AS	Fluridone	Pond 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	no irrigation of established tree crops – 7 days new crops and turf – 30 days	do not use in tidal or brackish water or on farmed crayfish
Rodeo	Glyphosate	4 pints/acre as a 0.75% solution with ionic surfactant in water	do not apply within 1/4 mile of potable water intakes	treat actively growing plants

plant die-off can cause oxygen depletion, while heavy growth can cause pH shifts on a daily cycle.

REFERENCES AND FURTHER READING

Aulbach-Smith, Cynthia A., Steven J. de Kozlowski, and Lawrence A. Dyck. 1990. Aquatic and wetland plants of South Carolina. South Carolina Aquatic Plant Management Council and South Carolina Water Resources Commission, Columbia.

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Traver, David P., John A. Rodgers, Michael J. Mahler, and Robert L. Lazor. 1978. Aquatic and wetland plants of Florida. Special Publication, Florida Department of Natural Resources, Bureau of Aquatic Plant Research and Control. Tallahassee, Florida.

FOR FURTHER INFORMATION

For general information about the Maryland Sea Grant Extension Program, visit the web:

<http://www.mdsg.umd.edu/MDSG/Extension/index.html>

For technical questions, contact an extension agent or specialist at one of these locations:

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University of Maryland
Wye Research and Education Center
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Maryland Sea Grant Extension
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Chesapeake Biological Laboratory
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FOR ADDITIONAL COPIES

Copies of Maryland Sea Grant Extension workbooks on aquatic plants, including color photographs for use in identifying species, are available on the web at:

<http://www.mdsg.umd.edu/MDSG/Extension/Workbooks>

Additional copies of printed workbooks are available from the Maryland Sea Grant College Program, 0112 Skinner Hall, University of Maryland, College Park, MD 20742-7640.

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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.



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