



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.

FLOATING VEGETATION

Duckweed

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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, submergent, emergent and terrestrial. Floating vegetation includes plants such as duckweed that are unrooted but float freely and plants that are rooted to the pond bottom but have leaves that float on the surface. Both types derive all their nutrients directly from the water either through the cell wall or through a highly vascularized root system.

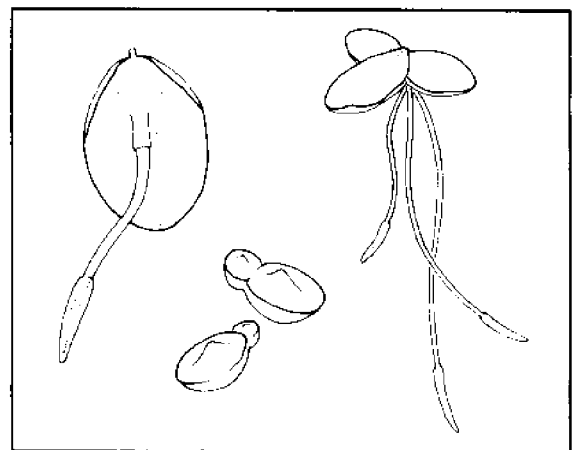
DUCKWEED

Among the world's smallest flowering plants, duckweed is one of the more commonly seen free floaters. Three common genera of duckweed are found in Maryland waters: common or little duckweed (*Lemna* species), giant or greater duckweed (*Spirodella* species) and watermeal (*Wolffia* species).

It is important to correctly identify duckweed as a vascular plant and not confuse it with algae (see workbooks on muskgrass,

filamentous and planktonic algae in this series) because the method of control for one usually does not work for the other. Although duckweed can completely cover the surface of a pond, control may be simpler than one would think. Its tendency to move over the pond with the slightest breeze makes wind-row a good method of control: once the plants have been blown into a corner of a pond, they can be mechanically removed or treated with the proper chemical. While control may be simple, eradication is almost impossible because individual plants are so small that a few can easily get trapped behind other plants, sticks or logs and avoid being wind-rowed. These few plants can soon repopulate an entire pond.

Duckweeds are annuals generally found in quiet water and slowly flowing streams. They may have gotten their name from the fact that



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Floating Vegetation: Duckweed.

ducks eat the plant, or that they get introduced to a pond by sticking to the feathers or feet of ducks. Hardy and tremendously prolific, they are indicators of a hard-water habitat, as they are not usually found in waters low in alkalinity or hardness.

IDENTIFICATION

Common or little duckweed *Lemna* is a very small (2 - 4 mm long and 1.5 - 3 mm wide) usually solitary plant with the leaves (actually fronds) being round to elliptical and attached in pairs. The plant may be flat on both sides and

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

Duckweed				
Chemical Name	Chemical Type	Application	Restriction Periods	Comments
Weed Boomer	Diquat dibromide	4 gal/acre in 150-200 gal water with 1 pt target wetting agent	livestock, watering, swimming, irrigation—10 days	do not use in muddy water
Diquat Herbicide-H/A	Diquat dibromide	1 gal/acre in 50-150 gal water with 1 pt Ortho X-77 Spreader	livestock watering, spraying, irrigation—14 days	do not use in muddy water
Sonar A.S.	Fluridone	Depth <3 ft 0.5-0.75 oz/acre 3-5 ft 0.75-1.0 oz/acre >5 ft 1.0-1.5 oz/acre	Irrigate established tree crops—7 days/new crops and turf—30 days	do not use in tidalwater or brackish water or where crayfish are farmed
Aquazine	Signazine	3.4-8.8 lb/acre	livestock, watering, spraying, irrigation—12 months	do not apply more than 10 lb/acre where striped bass fry or fingerlings are to be cultured immediately
Aquasquat	Diquat dibromide	16 oz/1000 sq ft Dilute 60:1 with water and add 0.5 tablespoon of non-ionic surfactant/gal	livestock watering, spraying, irrigation, domestic purposes—14 days	do not use in muddy water
912 Aquatic Weed Killer	Diquat dibromide	10 gal/acre in 50-150 gal water	livestock, watering, swimming, spraying, irrigation—10 days	do not use in muddy water
Wairol Herbicide	Diquat dibromide	24 gal/acre in 30-150 gal water	livestock watering, swimming, spraying, irrigation—14 days	do not use in muddy water
Ultimate	Diquat dibromide	10 gal/acre in 50-150 gal water	livestock watering, swimming, spraying, irrigation—14 days drinking—24 days	do not use in muddy water
Weed RHAP LV-4D	Isocetyl ester 2,4-D	2.5-4.5 pt in 50-100 gal water	do not use water for irrigation or livestock watering	at temperatures above 95 F, vapors may damage crops
Weed RHAP LV-6D	Isocetyl ester 2,4-D	1.67-3 pt in 50-100 gal water	do not use water for irrigation or livestock watering	at temperatures above 95 F, vapors may damage crops

usually has three nerves. It has a light green surface and usually contains only one root per frond. Reproduction can occur by seeds, budding or fragmentation.

Giant or greater duckweed is the largest of the floating duckweeds, rarely solitary, and has attached, ovate fronds in groups of two to five. The fronds are 3-10 mm long and almost as broad. There are five to eleven obvious nerves. The plant is dark-green on top and purple-red below. Each frond usually has four to nine roots. Reproduction is generally by vegetative budding, but can occur 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 the duckweed 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 non-tidal, 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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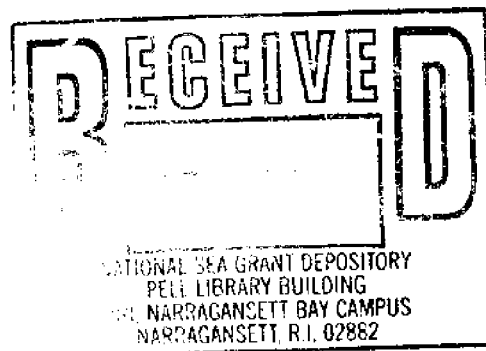
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