



Duckweed and Watermeal

Duckweed and watermeal are free-floating aquatic plants that are commonly encountered in Pennsylvania. They are commonly found in nutrient-rich ponds with stagnant or little flow.

 ARTICLES | UPDATED: NOVEMBER 2, 2015



Duckweed and watermeal covering a pond.

Description

Eight different varieties of duckweed exist in Pennsylvania. Duckweed can be recognized by its small, single or grouped, round- to elliptical-shaped floating frond or leaf, with a root that hangs from the underside of the plant. The frond or leaf of duckweed ranges in size from 2 to 6 millimeters--roughly the diameter of a pencil

eraser.

Three different species of watermeal are present in the state. Watermeal is identified by its very small, oval single frond or leaf that has no roots. It has the appearance of floating grass seed on the surface of the pond. The frond or leaf of watermeal ranges from 0.2 to 1.5 millimeters in length--about the size of a pin-head.

Both duckweed and watermeal produce flowers. In fact, they are the smallest flowering plants known. The flowers are very small and rarely observed. Both of these plants reproduce by budding and fragmentation.

Value and Concern to the Pond Ecosystem

Duckweed and watermeal both have value to the pond ecosystem because they serve as food for numerous types of organisms. They are especially important as a food source for waterfowl.

While these individual plants are small, they can reproduce prolifically and quickly cover the entire pond surface when growing conditions are right. This type of an infestation can block sunlight, inhibit oxygen exchange, and reduce dissolved oxygen concentrations in the pond water when the plants die and decay.

Preventing Duckweed and Watermeal

Any overabundant plant growth is a symptom of excessive nutrients (phosphorus and nitrogen) in the pond water. These nutrients may come from runoff from barnyards, crop fields, septic systems, lawns, and golf courses. Long-term control of overabundant aquatic plants is best accomplished by reducing or redirecting nutrient sources from the pond. This can be done by reducing fertilizer applications near the pond, maintaining septic systems properly, redirecting nutrient-rich runoff away from the pond, and maintaining vegetative buffer strips around your pond. If you fail to address the underlying nutrient causes of aquatic plant growth, you will probably encounter a perpetual need to control overabundant plant growth using the methods described in the following sections.

Control of Duckweed and Watermeal

Multiple methods of control are available for both duckweed and watermeal. Combining and using multiple management methods is usually most effective. In all cases it is best to treat these plants before they cover the majority of the pond. Treatment of such an extreme infestation may create chemical and biological imbalances in your pond. If you have questions about the best management options for duckweed or watermeal in your pond, seek advice from your county extension office or another reputable information source before making a management decision.

Physical Controls

Physical control of duckweed and watermeal is usually accomplished by netting or raking the plants off of the pond and then disposing of plant material away from the pond so that wind or runoff cannot transport it back into the pond. The use of a pump or vacuum device can also be used to skim the plants from the pond surface. This method can be very effective on small ponds and is especially attractive because it also removes the nutrients associated with the plant material. Physical removal must often be combined with other management techniques on larger ponds.

Another physical control strategy is the use of aeration. Duckweed and watermeal prefer to grow in stagnant water. Aerators that disrupt the surface of the water will limit the growth of these plants to the sides of the ponds where they can more easily be removed using nets and seines.

Biological Controls

No biological controls for watermeal exist, but grass carp will provide some control for duckweed. However, grass carp are usually not able to eat enough duckweed to keep it under control and they will often eat other submerged vegetation before consuming duckweed. Grass carp must be purchased from an approved hatchery after receiving a state permit. For more information on the grass carp permit and approved hatcheries, consult the fact sheet titled [Pond Owners Guide to the Use of Triploid Grass Carp](#) in Pennsylvania available from your local Pennsylvania Fish and Boat Commission office or online at the Penn State Extension website.

A secondary biological control that can prevent infestation or reinfestation is limiting or deterring waterfowl access to the pond. While it was mentioned earlier that waterfowl feed on these plants, they are also a major transporter of duckweed and watermeal into ponds. These tiny plants lodge between the feathers of ducks and geese and then are freed when the waterfowl lands and swims on other ponds. You can learn more about controlling nuisance waterfowl from the extension fact sheet titled [Wildlife Damage Control #6: Geese, Ducks, and Swans](#).

Chemical Controls

Only a few chemical controls on the market are labeled for use and are effective for the treatment of watermeal and duckweed. When used appropriately following the label instructions they can be safe and effective management tools. One chemical

control used for the treatment of watermeal and duckweed contains the active ingredient fluridone (41.7 percent). This chemical is available under the trade name of Sonar™. Depending on the depth of your pond, your dosage rates will change. For a pond with an average depth less than 5 feet, the dose would be 0.16 to 1.25 quarts per acre. For ponds with an average depth over 5 feet, 1.0 to 1.5 quarts per acre should be applied. Fluridone is nonselective at rates to control watermeal and duckweed, so many other plants may be affected. It is most appropriate for ponds with very little or no overflow.

Another aquatic herbicide labeled for use on duckweed is diquat dibromide, which is available under the trade name Reward™. It is typically applied at a dosage of 1 gallon per surface acre, but it is usually not as effective on duckweed as fluridone and may require more than one treatment.

A relatively new herbicide with the active ingredient Flumioxazin is also effective for duckweed and watermeal control. This herbicide, commonly called "Clipper" is a fast acting contact herbicide which is most effective when applied to young, actively growing plants in water with a pH of less than 8.5. Fluxioxazin is applied by broadcasting a mixture of 6 to 12 ounces per pond or lake acre. The label also suggests using an approved adjuvant product with Fluxioxazin.

You can learn more about the various aquatic herbicides and their use in [Management of Aquatic Plants](#) . Here are some tips to properly use an aquatic herbicide to control duckweed and watermeal:

- Keep in mind that chemical control is often necessary every year or even multiple times during a year.
- Make sure that you positively identify the plant in your pond as duckweed and/or watermeal before proceeding with chemical control.
- Carefully measure the pond area and/or volume to determine the amount of herbicide needed. Consult the fact sheet titled *Pond Facts #4: [Measuring Pond Area and Volume](#)* for more information.
- **Make sure that you obtain and submit the required state permit before applying the herbicide.** Before applying a herbicide to your pond, you must obtain a state permit from the Pennsylvania Department of Environmental Protection. The two-page application form and instructions for this permit are online at [Application and Permit For Use of an Algaecide, Herbicide, or Fish Control Chemical in Waters of the Commonwealth](#).

- Aquatic herbicides like Sonar™ can usually be purchased at home and farm supply stores, hardware stores, or from various online suppliers. Fluridone products will typically cost \$750 to \$1,000 per acre of pond area that you treat. Diquat dibromide products usually cost \$200 to \$400 per acre. Flumioxazin typically costs less than \$200 per treated acre.
- Follow the herbicide label carefully. The herbicide label gives specific instructions on when and how to apply the chemical.
- Herbicide treatments for duckweed and/or watermeal should be done before the plants cover a large portion of the pond. Treatment of severe infestations of these plants may cause a fish kill due to reduced dissolved oxygen from the decay of large amounts of plant material.

A Final Word

Many ponds suffer from duckweed and watermeal infestations. Where possible, you should strive to reduce nutrients entering the pond and remove the plants using mechanical approaches. Chemical treatments for duckweed and watermeal are effective, but the products are expensive and treatment often must be repeated annually or even multiple times per year to keep these plants under control.

Additional Resources

For further information and publications on pond management in Pennsylvania visit the Penn State Extension website or contact your local Penn State Extension office.

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