

AQUATIC PLANT MANAGEMENT

# Control of Duckweed and Watermeal

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Duckweed and watermeal are surface-floating plants that can make a pond unsightly and unusable (Figure 1). But these tiny plants can be more than just an eyesore: thick growths can prevent sunlight from reaching deeper parts of the pond, preventing underwater plants and algae from photosynthesizing and producing oxygen. In turn, that lack of oxygen can stress or kill fish. Typically, ponds infested with duckweed or watermeal lose fishing quality over a period of years.

This publication explains how to identify these aquatic plants and provides strategies for managing them effectively.



**Figure 1.** Watermeal plants are so small that there are thousands of plants in a handful.



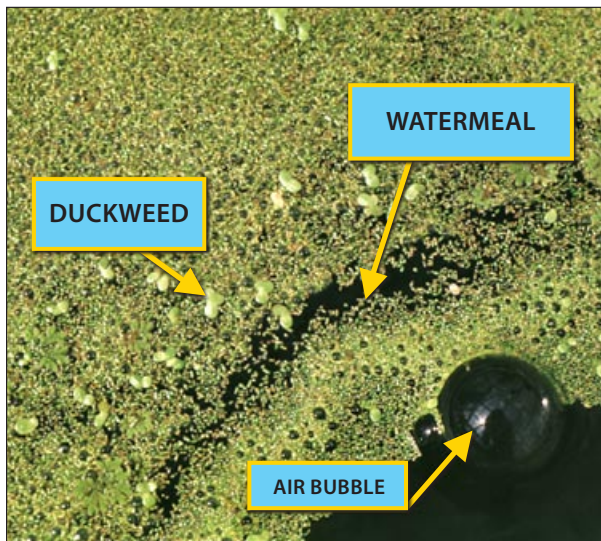
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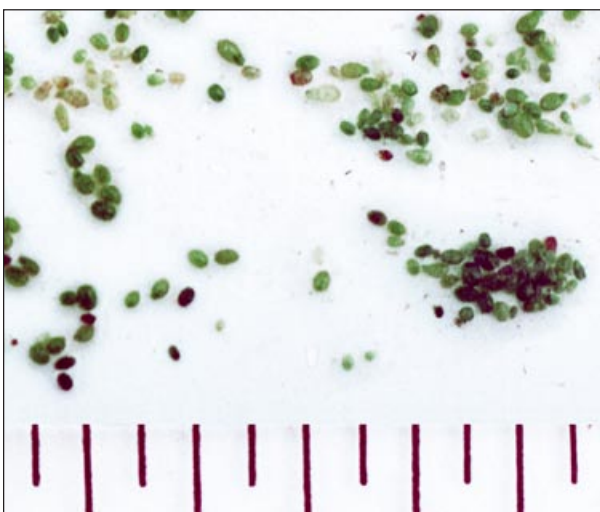
Photos contributed by  
Carole Lembi and Debra Lubelski.



**Figure 2.** Note the roots hanging from each of these duckweed plants.



**Figure 3.** Watermeal plants are very small, much smaller than the duckweed also shown in this image.



**Figure 4.** Individual watermeal plants are less than 1/16 inch wide. They do not have roots.

## Identification

Individual duckweed plants are 1/8 inch to 1/4 inch wide. They are generally round in outline, and have a single root hanging from each small plant (Figure 2).

Watermeal is much smaller than duckweed (Figure 3) — in fact, it is the smallest flowering plant in existence. Watermeal plants look like tiny green seeds that are less than 1/16 inch wide (Figure 4). A handful of watermeal will feel gritty, like rubbing cornmeal between your fingers.

## Habitat

Duckweed and watermeal are more common in ponds located in or at the edges of woods than in ponds in open areas. These plants require a lot of nutrients (nitrogen and phosphorus) to grow, so typically they are found in nutrient-rich environments such as ponds that receive drainage from farm fields, feed lots, and other similar sites. Their association with trees suggests that leaf litter may play an important role in providing nutrients. The bottom sediments of infested ponds are often very black and mucky. This organically rich material also can be a major source of nutrients.

Duckweed and watermeal can be spread from one pond to another by humans, and by birds such as ducks (Figure 5) and Canada geese. The small plants can stick to the sides of boats, or lodge in the feathers of birds swimming in infested water. When the boat enters a new body of water or the birds migrate, the plants go with them.

Both duckweed and watermeal disappear from pond surfaces in late fall. Why does this happen and where do the plants come from when they reappear the following spring?



**Figure 5.** Watermeal and duckweed can lodge in the feathers of waterfowl, which then transport the plants to new bodies of water.

In the summer, the plants are photosynthesizing. This process produces oxygen that gets trapped in the plants, allowing them to float. At the same time, the plants are producing food in the form of starch. Each fall, the accumulated starch makes the plants heavier than water. As photosynthesis slows and the plants produce less oxygen, they lose buoyancy, and sink to the bottom sediments where they overwinter, relying on stored starch for energy. In the spring, the plants start photosynthesizing again, accumulate oxygen, and then rise to the surface to repeat the cycle.

Given enough nutrients, duckweed and watermeal can reproduce prolifically and cover an entire pond within a few weeks after coming to the surface. They reproduce by budding, and in some cases, can produce a new plant every 24 hours.

## Control

Controlling duckweed and watermeal is difficult and challenging. There are non-chemical and chemical management options.

### Non-chemical Methods

Non-chemical control options start with eliminating obvious sources of nutrients, such as lawn fertilizers, leaf litter, and drainage from feedlots. Skimming plants off the surface can work, but the plants must be disposed of so that they do not wash back into the pond. Introducing grass carp is not a viable option because duckweed and watermeal are not preferred foods.

Draining a pond is an alternative if renovation is desired. The bottom sediments must be removed to eliminate both nutrients and plants.

### Chemical Methods

Herbicides are another option for dealing with these pests. Two herbicides are labeled for duckweed and watermeal control: diquat and fluridone. Remember, never use a product to control aquatic vegetation unless it is specifically labeled for that purpose. Always read and follow label directions.

#### Diquat

Diquat (Reward® and other trade names) is a contact herbicide sprayed directly on floating plants that turns plant tissue brown, usually within a few hours after treatment. In a successful treatment, the dead plants will sink to the bottom.

Because duckweed and watermeal plants are so small and numerous, a single application seldom kills all the plants.

In addition, Reward® is typically gone from the water 7 to 10 days after treatment. So, follow-up applications will be needed during the season. Treat the plants as soon as they reappear.

Apply Reward® at 1 to 2 gallons per surface acre. Dilute the product in 50 to 150 gallons of water per acre and mix in a nonionic surfactant as directed on the herbicide label. Nonionic surfactants can be purchased at most places that sell Reward®.

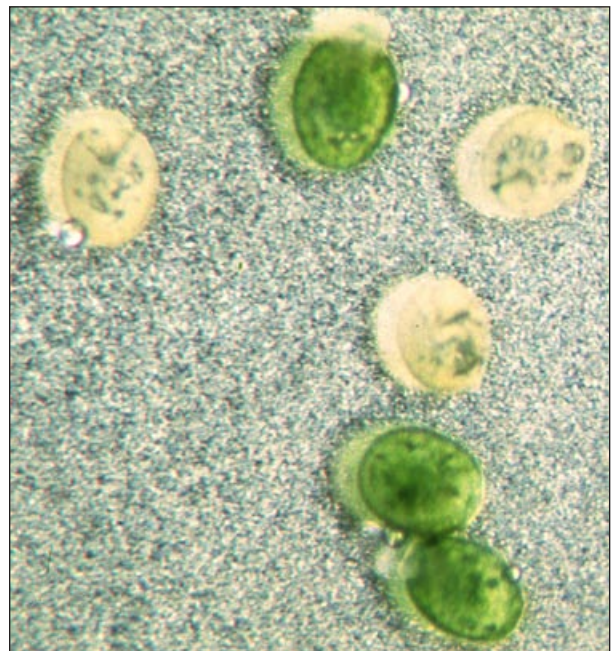
Begin treatments as soon as plants start growing in the spring to stay ahead of the growth. It is helpful to treat when the wind has pushed the plants to one end of the pond. The spray should be concentrated on the plants in that area. However, do not forget to spray small patches that may still be floating on other parts of the pond or washed up along the banks because they will be a source of new plants.

Multiple treatments of Reward® can successfully control duckweed; unfortunately, they seldom give effective control of watermeal.

#### Fluridone

Fluridone (Sonar® AS, Avast!®) is not a contact herbicide like diquat, but a systemic herbicide that moves slowly into plants to kill them. As a general rule, fluridone is very effective for the control of duckweed. It will control watermeal in most sites, but sometimes, for unknown reasons, it has little or no effect.

Fluridone turns affected plants almost pure white (Figure 6).



**Figure 6.** Watermeal plants will turn almost pure white after being treated with fluridone.

Fluridone works much more slowly than diquat, so its effects may not be noticeable for two or three months. It is imperative that pond outflow be minimized for at least 30 days (preferably longer) for good control.

SePRO ([www.sepro.com](http://www.sepro.com)), which manufactures Sonar® AS, offers a test (FaSTEST) that determines the concentration of Sonar® AS in the water. Test results are available within 48 hours. This is important if the pond owner is not seeing results and suspects that the chemical is no longer at a high enough concentration to be effective.

Use the Sonar® AS formulation for duckweed and watermeal control, not Sonar® SRP or other formulations. For duckweed control, apply at 1 quart per surface acre (where the average depth is 4 feet) in a split application 10 to 14 days apart. For example, on a 1-acre pond, apply 1/2 quart, and then the other 1/2 quart 10 to 14 days later.

Treat as soon as plants appear in the spring. Apply the chemical fairly evenly over the water surface. It is not essential to spray the plants as it is with Reward®.

For watermeal control, the dose should be 1.5 quarts per surface acre if the average depth is more than 5 feet. Again, it is critical that there be no outflow from the pond and that the treatment be split.

A possible (but expensive) strategy for successful watermeal control is to kill the surface plants with a treatment of Reward®, and then follow that with a split Sonar® AS treatment to kill the recovering plants.

### Cost Considerations

One of the main stumbling blocks to using fluridone is its cost. In 2008, a quart of Sonar® AS cost about \$633, while a gallon of Reward® cost about \$154.

In analyzing the benefits of diquat versus fluridone, pond owners must choose between a cheaper product that may

have to be used over and over again, and a more expensive product that, when it works, provides excellent control and may prevent new growth the following year.

### Water Restrictions

Water treated with Reward® or Sonar® AS can be used for swimming and fishing immediately after use.

Depending on the dosage, water treated with Reward® must not be used for:

- Irrigation for 1 to 5 days
- Drinking water for 1 to 3 days
- Livestock watering for 1 day

Water treated with Sonar® AS must not be used for irrigation of trees, turf, or crops for 7 to 30 days (check label for exact restrictions). Sonar® AS must not be applied within a quarter mile of drinking water intake pipes.

Note: the above restrictions apply to Indiana. Other states may have additional restrictions. Always check with local and state regulatory agencies before using these products.

### Find Out More

Other Purdue Extension publications in the *Aquatic Plant Management* series are available from The Education Store, [www.extension.purdue.edu/store](http://www.extension.purdue.edu/store).

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