MANAGEMENT OF DUCKWEED AND WATERMEAL IN PONDS

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INTRODUCTION

Two of the most common floating weeds in ponds are watermeal and duckweed. Both are difficult to control due to their fast growing habit and small size. Watermeal is harder to control than duckweed due to its very small size and lack of roots. The spread of both plant types is caused by waterfowl moving from one body of water to another. Boats and boat trailers also spread these plants into new locations.

Duckweed control is difficult for several reasons. First, duckweed is a very fast growing plant. It is resistant to most herbicides that can be used in ponds. Glyphosate, endothal, and 2,4-D are not effective for duckweed or watermeal control. Contact herbicides, including diquat, must contact the plant for effective control. With so many small plants in a duckweed or watermeal infestation, many are not exposed to the chemical unless it is applied very carefully for complete coverage of the plant infestation. Fine sprays and repeated applications must be considered with duckweed control. Although, grass carp will consume duckweed and watermeal, they have difficulty controlling established duckweed infestations. Finally, the conditions that allowed the duckweed infestation will remain after herbicide treatment. Standing brush and trees act as a substrate for duckweed to find refuge in. Still water protected by high banks or heavy forest is ideal duckweed and watermeal habitat. Nutrients accumulated in older ponds, or added from runoff, pollution, or fertilization, stimulate the fast growing duckweed.

CHEMICAL CONTROL

The contact herbicide diquat (Reward™) has been used to control duckweed and watermeal in the past. However, species of duckweed have developed resistance to diquat, and watermeal control requires higher rates of chemical application. Fine sprays and repeated applications must be used for duckweed control in order to reach most of the plants. Therefore, repeat treatments are probably unavoidable. Four to seven days after treatment, check carefully for untreated plants and regrowth. Repeat application when untreated plants are observed.

One of the most effective chemical control for duckweed would be a co-application of diquat with a liquid copper formulation (copper complex similar to Cutrine-Plus™, K-Tea™, Captain™, Nautique™, Clearigate™ or Komeen™). When copper is present, diquat uptake by plants is increased. The combination has a more toxic effect on aquatic plants in the application area. The two herbicides are combined into a tank mix containing various ratios of diquat and copper liquid depending on the label recommendations. Mixtures of 2:3 or 1:2 parts diquat:copper liquid have been recommended. Always partially fill the spray tank before adding the chemical and mix the concentrates in the dilution water, not in the concentrated form. Rates
of application of the herbicide mixture range from 1 to 3 gallons per acre. Good control can be achieved for a one-acre infestation of duckweed by diluting 1.5 gallons of the diquat/copper mixture with 100 gallons of water and adding 4 oz of non-ionic surfactant labeled for aquatic use. Apply evenly over the surface of the duckweed with a fine mist spray. This tank-mix treatment is longer lasting than treating with diquat alone. Always prepare to aerate ponds that have fish populations in order to avoid oxygen depletion after herbicide treatment.

A systemic herbicide, fluridone (Sonar™ or Avast!™), can control duckweed if the pond water does not exchange enough to dilute the treatment concentration. In order to maintain the recommended concentration of fluridone for 45 days, minimal dilution from rainfall or inflowing streams is required. Re-treatment with fluridone is recommended after a dilution event has occurred. Both diquat and fluridone provide only partial control of watermeal. However, fluridone effectiveness can be increased by applying a tank-mix of fluridone (Avast!™) with copper liquid (Komeen™). The tank-mix is prepared for one acre of application by mixing 20 gallons of water with 4 gallons of Komeen™ and 0.3 quarts of Avast!™ and applied in a uniform surface spray. Using fluridone may provide season long control, after an initial period of 30 to 90 days when the desired level of control is achieved.

Another systemic herbicide, imazapyr (Habitat™), has recently been labeled for use in aquatic environments for duckweed control. Watermeal may be partially controlled with imazapyr. A solution of 1% imazapyr in 100 gallons of water with a non-ionic surfactant applied to one acre of duckweed infestation is recommended for control. Allow several weeks for the desired level of control to be obtained. Apply imazapyr early in the season, before extensive duckweed coverage occurs, because of the slow herbicidal activity and the fast growth-habit of duckweed. Imazapyr applications to water requires a 120-day waiting period before irrigation or measurement of less than 1.0 ppb residual concentration. Additionally, new aquatic labels are appearing each year that include duckweed and watermeal. Check with your local county agent for updated control options.

All aquatic herbicides are more effective under the optimum environmental conditions. Herbicides should be applied with water temperatures warmer than 70 degrees Fahrenheit. However, diquat and copper formulations may be effective at 50 degrees Fahrenheit. Most aquatic herbicides are active at the pH found in fish ponds; however, non-fish bearing waters may have high or low pH extremes. Contact the herbicide manufacturer for guidance when water pH is below 6.0 or above 9.0.

Always check the chemical labels for restrictions and follow the strictest label statements. Irrigation after systemic herbicide application should be avoided. Some herbicides must not be added to waters used for potable water supplies. All herbicides have different restrictions for returning to swimming, fishing, or livestock watering. Always wear proper protective clothing and devices prescribed by the label.

Proper application includes application during the early stages of infestation, proper calculation of the amount of active ingredient needed, and proper distribution of the herbicide across the weed infestation. Cost for duckweed control exceeds $130.00 per acre for a single herbicide
treatment Grass carp would cost $200.00 per acre initially but about $33.00 per year over their useful life.

Table 1. These chemicals control duckweed or watermeal if they are properly applied.

<table>
<thead>
<tr>
<th>Weed</th>
<th>Sonar or Avast!</th>
<th>Reward</th>
<th>Weedtrine</th>
<th>Reward + Cutrine plus</th>
<th>Habitat</th>
</tr>
</thead>
<tbody>
<tr>
<td>Duckweed</td>
<td>0.24 qt/A-ft</td>
<td>1-2 gal/A</td>
<td>5 gal/A</td>
<td>1-2 gal/A</td>
<td>2-3 pints/A</td>
</tr>
<tr>
<td>(Lemna sp.)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Watermeal</td>
<td>0.24 qt/A-ft</td>
<td>1-2 gal/A</td>
<td>5 gal/A</td>
<td>1-2 gal/A</td>
<td>N/A</td>
</tr>
<tr>
<td>(Wolffia sp.)</td>
<td>(or more)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Purchase</td>
<td>1 pint</td>
<td>1 gallon</td>
<td>1 gallon</td>
<td>1 gallon Cutrine plus/ 2:3 tank mix</td>
<td>1 quart</td>
</tr>
<tr>
<td>Volume</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Aprox. Price</td>
<td>$ 620.00</td>
<td>$ 115.00</td>
<td>$ 60.00</td>
<td>$ 30.00/ $ 64.00</td>
<td>$ 200.00</td>
</tr>
</tbody>
</table>

**FISH THAT CONTROL DUCKWEED**

Once the duckweed is controlled, keeping the pond clear is always a problem. As soon as possible after herbicide application, stock triploid grass carp at up to 20 carp per acre. Triploid grass carp are functionally sterile and are the only type allowed in Georgia. Since this fish is an exotic, it must be stocked according to state and federal laws. Purchase the fish from sources that sell Certified Triploid Grass Carp. Remember to use 14-inch long grass carp (about one pound each) when largemouth bass are present. This size and density will minimize grass carp losses to predation and natural mortalities. Use a spillway fence to keep the grass carp in the pond during periods of pond overflow. Restock the grass carp every 6 to 8 years. Removal of large old grass carp is at the discretion of the pond owner. Grass carp can provide portions of delicious white meat when properly prepared.

**PHYSICAL DETERRENTS**

Remove the cause of the duckweed problem, if possible. Clear out standing trees and brush from the pond. This usually must be done when the pond is empty. However, some ponds can be lowered to expose shallow areas without complete draining. Open up forested areas so that at least one side of the pond is exposed to wind action. Wind will keep duckweed pressed against the shore and limit pond surface coverage. Aerators cause surface disturbance and help push the duckweed to the pond edge. Wind and aeration help stir the water column so that nutrients, particularly nitrogen, are brought up near the water surface. Over time, nutrients leave the pond by volatilization, flushing, leaching, and uptake by algae and fish.

**REFERENCES**


Disclaimer: The author of this publication does not advocate any products listed in this publication. Products mentioned have been described due to specifics of particular control methods on product labels at the time of publication.