

GRASS CARP FOR AQUATIC WEED CONTROL

Grass carp (*Ctenopharyngodon idella*), or white amur, is a member of the minnow family native to Asia. They feed almost exclusively on aquatic plants. Their short digestive tract requires grass carp to feed almost continuously when water temperatures are above 68°F, which means they can eat two to three times their body weight each day. This makes them an excellent biological control of certain nuisance aquatic plants.

Grass carp are capable of fast growth and may gain 5 to 10 pounds per year, reaching their final size of 20 to 30 pounds within a few years, and can live for 10 to 15 years. Unfortunately, when they reach maturity, their rate of weed consumption declines, and restocking of additional fish is required every 3 to 5 years.

Grass carp have definite preferences of the type of vegetation they consume. They prefer tender, succulent vegetation that is under water. This makes them best suited for submerged vegetation, and they will not generally control tough, fibrous plants that grow up out of the water. The extent to which they are able to control a particular weed depends upon many factors, including their feeding preferences, the aquatic plant density, water temperature and the number and size of grass carp stocked. As more preferred vegetation becomes scarce, grass carp will eat less preferred types of

vegetation. Water chemistry can affect weed palatability. Grass carp will consume floating fish food as well as aquatic plants.

Grass carp are readily available in Arkansas, and the *Sport Fish Supplier List* provides a listing of the fish farms that sell grass carp. This publication is available at the county office or online at http://aqfi.uaex.edu/extension/farmponds/Pond_Management/pdf/Arkansas-Sport-Fish-Supplier-List-2012.pdf. Unlike many states, Arkansas permits the stocking of either diploid (normal) or triploid (sterile) grass carp in ponds and lakes. Because grass carp require flowing water to reproduce, stocking fertile grass carp in your pond will not result in more grass carp. New ponds can be stocked with 2- to 6-inch grass carp, but if largemouth bass are present, the grass carp stocked should be 8 to 10 inches in length. The stocking rates can vary depending on the amount of weeds. A standard recommendation is 5 to 10 per acre, but if the pond has plant coverage of greater than 50 percent, a stocking rate of 20 or more per acre may be required.

As a biological control agent, they will not provide immediate results. Assuming the target plant is readily consumed by grass carp, 1 to 2 years are required for control. If the pond/lake owner wants quicker results, applying an

aquatic herbicide followed by stocking grass carp 2 to 3 weeks later may be the best solution. Stocking should take place after much of the dead plant material has had a chance to decompose.

Grass carp are natural inhabitants of rivers and readily escape ponds that overflow. Barriers on spillways are a good idea to prevent fish losses. Ponds with grass carp often develop a green or yellow color as grass carp promote greater phytoplankton growth in the water by the release of nutrients from the plants they eat.

After the grass carp reach maturity, the pond/lake owner may want to remove them. These large fish can be removed by snagging, bow fishing, spearing or angling. Their habit of hanging near the surface can make bow fishing especially simple. Because of their jumping ability, seining is often not effective. Their flesh is white, firm and not oily, but the muscle mass contains "Y" bones that can make cleaning more difficult. Their flesh is considered a delicacy by many seafood enthusiasts.

For more information, ask your county extension agent for Southern Regional Aquaculture Center (SRAC) Fact Sheet #3600, *Using Grass Carp in Aquaculture and Private Impoundments*, or it can be downloaded from <https://srac.tamu.edu/index.cfm/event/getFactSheet/whichfactsheet/160/>.

GOLDFISH (*CARASSIUS AURATUS*) FOR WATERMEAL AND DUCKWEED

Duckweed (*Lemna* spp.) and Watermeal (*Wolffia* spp.) are free-floating aquatic plants commonly found together. Watermeal is the smallest and simplest of flowering plants. It is rootless and tiny, usually less than 1 mm, and appears as little green pinheads floating on the surface. To the touch, it feels somewhat like dry grits. Duckweed is a little bigger but still very small, usually 1/8 to 1/4 of an inch across. The fronds tend to be elliptical, and a small root is present on the lower surface of each frond.

The growth of these plants is linked to high nutrient levels, which is why they are common in cattle ponds. Both of these plants tend to grow in dense colonies in quiet waters.

Aquatic dyes are made from EPA-registered nontoxic dyes (typically blue) that can be applied to natural and man-made lakes and ponds to help control filamentous algae and submersed plants. They do not kill plants; they prevent growth by limiting light penetration, which reduces photosynthesis. They are less effective when plant growth is near the surface (2 feet or less). Aquatic dyes should only be applied to water bodies entirely within the control of the applicator, and only those with little or no outflow. If water is continuously released from the pond/lake, product is wasted and

Individual plants stick readily to birds, animals and equipment that may be in ponds that have these plants. As a result, they spread easily from one pond to another. Once in a new pond, their growth can be quite explosive if the conditions are right. Both species can reproduce by budding and, in some cases, double their population every 24 hours.

Both watermeal and duckweed tend to disappear from the pond surface in the late fall. During the summer, the plants have buoyancy due to trapped oxygen from photosynthesis. In the fall, photosynthesis slows down, leading to less oxygen in the plant, and the accumulated starch from a season of growth

makes the plant heavier, so it sinks to the sediments. In the spring, the plants start photosynthesizing, accumulate oxygen and float to the surface again.

Under certain conditions, goldfish can provide a biological control option for watermeal. It is recommended that they be stocked into small ponds at a rate of 35 to 65 pounds per acre. Like any biological control, results take time and are not universal. In ponds where goldfish failed to control watermeal, it may have been due to predation from largemouth bass or some other factor. Stocking them is fairly inexpensive and will cause no harm, but success is not guaranteed.

AQUATIC DYES

effectiveness reduced. The effects of an aquatic dye typically last up to 6 weeks.

Dye should be applied in the late winter/early spring before weed growth begins or applied when weeds may be seen on the bottom of the pond. When applied to ice, it will melt a hole and disperse underneath. Additional applications will be necessary throughout the year to maintain an acceptable level of dye in the water. These dyes may be used at any time of the year.

Do not apply dyes to water that will be used for human consumption. Water may be used for swimming after complete dispersal of the dye in water. Dyes are nontoxic to livestock.

Formulations include AquaShade, Admiral Liquid, Admiral WSP, SePro Blue, Lake Colorant Liquid and Lake Colorant WSP, though this list is undoubtedly incomplete. For the liquid formulations, the rate is typically 1 ppm, or 1 gallon/acre*^{ft}. To restrict hydrilla growth, the rate should be doubled, due to its ability to grow at very low light levels. See label for rates.