

Aquatic Plants for Ponds and Small Lakes: Benefits and Suitable Species

Numerous pond owners' call requesting assistance with excessive "moss" (filamentous algae), duckweed, watermeal, and/or algae blooms (planktonic algae). Usually, these plants cause the most problems, in ponds and lakes with little or no rooted plants (macrophytes), due to new construction, repeated use of herbicides, or after the wane of a grass carp stocking in which the carp have eaten all other aquatic plants.

Ponds and lakes can be thought of like a pasture or lawn. In pastures or lawns, if desirable plants (grasses) are not present, undesirable plants (weeds) will grow unimpeded. If a pasture is overgrazed by cattle, unpalatable weeds dominate. Like lawns or pastures, ponds have inherent levels of fertility. When desirable submersed rooted plants are absent more nutrients are available for growth of undesirable plants, "weeds".

Nutrient levels in soils and additional fertilizer inputs from human activities play a major factor in plant problems. When soils are fertile ("dark" soils), ponds will produce more plants and fish. When soils are less fertile ("light" soils), ponds will produce less plants and fish. Algae blooms resulting from the lack of rooted plants may NOT be as much of a problem where soils are infertile, but will likely be a significant problem where soils are more fertile. Fertilizer input from agricultural practices, manicured lawns, and septic systems add nutrients and can fuel additional plant growth in ponds. In addition, over time ponds fill-in with silt and accumulate nutrients that can fuel plant problems as well.

Unfortunately, touted as a cure-all, **grass carp** provide an "all-or-none" effect. Unless "over-stocked," it may not appear that grass carp are reducing problem plants. When overstocked, usually "all" plants, including filamentous algae will be eaten. Due to the digestive process of grass carp, many nutrients are quickly released back into the water with the carp's waste. These nutrients, along with the nutrients not used by the plants previously eaten, provide a fertile environment for **other** plants to grow that grass carp cannot or do not like to eat.

The plants which grass carp cannot eat, or do not like to eat, will occur as the initial plant problems after the grass carp numbers begin to decrease due to natural mortality. Grass carp DO NOT eat or control planktonic algae or watermeal. Even before grass carp numbers begin to decrease, the nutrient rich environment quickly produces a plankton bloom, or occasionally, total coverage of the pond by watermeal. The severity of effect is dependent on soil fertility and other nutrient inputs.

"New" ponds with no rooted plants, or in older ponds with repeated herbicide treatments in which rooted plants are eliminated, provide conditions where the lack of competition for nutrients allow these and other nuisance plants to grow! Again, natural soil fertility levels and human inputs can have an impact on these results.

Phytoplankton blooms (microscopic suspended algae) and **watermeal** (very tiny floating plants without roots, resembling a green seed) are common causes of summer fish kills. With these plants, sunlight penetration into the water is reduced or eliminated, forcing all organisms into the upper, warmer, layer of water where some oxygen may remain.

Warm water does not naturally hold as

much oxygen as cooler water. Conditions can get critical in summer. During the night when all of the animals **AND** plants need oxygen, the larger fish will die due to insufficient oxygen from competition with plants, usually planktonic algae. This is often characterized by fish gulping at the surface just before and at sunrise, then the largest of each species of fish dying, including the grass carp which may have created the problem. On occasion an algae bloom will "die-off," which is then followed by the bacterial decomposition of the dead algae. This develops a similar competitive situation for oxygen, in which the fish lose.

Grass carp are not fond of eating **filamentous algae** (green/brown cotton-like mats) or **duckweed** (small floating leaves with hair-like roots). Duckweed often becomes a common problem in ponds with excessive nutrients in ponds protected from the wind. Otherwise, in open areas, filamentous algae usually becomes a problem when nutrients are excessive. Duckweed can quickly cause a summer fish kill when it covers the pond's surface. Although less likely, large amounts of filamentous algae can lead to a fish kill.

When nutrients are in excess, desirable species of aquatic plants **can actually help!** If they have not been introduced when the pond is new, a few species of rooted aquatic plants can be beneficial in reducing planktonic algae blooms, filamentous algae, watermeal, and/or duckweed for pond owners. In many cases these beneficial plants can eliminate the need to treat either chemically or biologically for any of these problem plants, especially planktonic and filamentous algae. By competing with these four problematic type of plants for nutrients, the beneficial species of aquatic plants will provide: clearer water, reduced shoreline erosion, fish

habitat, a wider variety of food items for fish and other organisms, which saves money for the pond owner. And best of all, they usually not become nuisances themselves!

There are six species of aquatic plants which are very compatible for pond owners in central Illinois which are worthy of establishing in ponds. Wild celery, American pondweed, three square bulrush, and wild iris are the four most easily recommended species. They generally remain confined to relatively shallow water, do not grow too tall, maintain a relatively "kept" appearance, and are easily treated or removed if necessary. Softstem bulrush and arrowhead are additional species which can be recommended to those more interested in wider diversity of plants. These two species grow taller and in somewhat deeper water than the previous plant species. Softstem bulrush and broadleaf arrowhead do not have as "neat" of an appearance as either iris and three square bulrush.

Wild Celery develops leaves which might remind you of extra-large lawn grasses. The strap-like leaves can reach six inches to 1.5 feet in length. The flowers, borne on a curled stalk, are nondescript, with seed pods resembling small bean pods when mature. This plant is a very important food item for waterfowl, turtles, and other animals. Although reported to grow to 9 feet deep, it does not appear to grow in water much deeper than 3 feet deep in central Illinois. Although several herbicides control celery easily, the only drawback to wild celery is that it is not as susceptible to as many herbicides as most other plant species. Grass carp do not prefer to eat wild celery, allowing low numbers of grass carp to be used to control other less-desirable species while the celery thrives. Wild celery is highly

recommended for fish habitat and has not become a problem in ponds or lakes in central Illinois. The Missouri Department of Conservation considers this species as the optimal submersed plant for ponds and small lakes. Establish wild celery in new ponds **immediately**, as it is much more difficult to introduce into older established ponds.

American pondweed produces floating leaves which emerge in late spring. The leaves are spear shaped with the flowers being rather dull small spikes. Usually, this species is restricted in its growth to water 3-1/2 feet deep or less. In ponds with steep banks this will keep this plant's growth close to the shoreline so that it is usually not a problem with fishing. On occasion it may grow deeper, especially in very clear ponds like gravel pits. It is easy to remove the plants from an area by hand, with chemicals, or mechanical cutters. Local sources of American pondweed are usually available, and I provide this species to interested pond owners annually, usually in early July. Pondweed established in many local public ponds has eliminated the need to treat for filamentous algae, significantly reducing the costs of maintaining ponds or lakes! Unfortunately, where the bottom slope is too gradual, this species has had to have been removed with chemicals or small numbers of grass carp.

Three square bulrush is a plant with "reedy" or "whip"-like stems which are triangular in cross section. The leaves have been reduced to a sheath at the base of the stem. The flowers are presented as brown bullet-shaped structures seated tightly near the tip of the stem. This plant is restricted in its growth to water less than eight inches deep. Although growing to 2.5 to 3 feet tall, it keeps a neat growth appearance and does not produce an overly thick stand.

Three square bulrush is an excellent shoreline stabilizer.

"Blue flag" wild iris looks very similar to the cultivated bearded irises, but with smaller flowers. It develops very showy blue flowers in late spring and early summer. The leaves can reach a height of 3.5 feet making this one of the taller of the most recommended species. Wild iris is restricted to growing very shallow water or on the shoreline. A dense root system helps protect the shoreline from erosion while flowers provide valuable aesthetic benefits.

Softstem bulrush, like three square bulrush, has whip-like stems, but they are round in cross section. The flowers are borne as brown bullet-shaped structures on short tassels in clusters near the end of the stem. This plant can grow in water depths up to 12 inches and reach heights of 4 feet. Stands can get rather dense, however, due to its patchy growth habits, usually does not interfere with fishing. This species is common throughout central Illinois and is an excellent shoreline stabilizer. Bulrush is easily controlled if needed.

Broadleaf arrowhead gets its name from the typical shape of leaves. However, the leaves can be quite variable even within a population. This plant does produce somewhat small, but very showy white flowers. The arrow-shaped leaves can reach 4 feet, but usually are around 2.5 feet. Stands can grow rather dense, but usually can be fished over easily. This plant develops a tuber from which new growth develops. Broadleaf arrowhead is locally abundant in central Illinois.

Unfortunately, most other common species of aquatic plants are too aggressive, grow too deep or thick, and/or are too difficult to control in the average pond. Water lilies and American lotus, have beautiful showy foliage

and flowers. However, they can quickly colonize a pond, grow in deep water, and are extremely difficult to control by hand, herbicides, or with grass carp.

Larger ponds or those with steeply sloping shorelines allow more flexibility in choosing plants. Smaller or shallow, usually older, ponds are much more restricted to what can be planted without hindering fishing and other activities. In shallow ponds, excess nutrients and shallow water allow plants to grow too far from the shoreline, creating problems.

Although, these and other plant species can be purchased through mail-order catalogs, this is **NOT** a recommended way to obtain starts, with the sole exception of wild celery. Most nurseries are located in Wisconsin, or extreme northern Indiana. The plants stocks these nurseries provide, from much further north, are different genetically than local populations. This is called being of a different "ecotype."

Pond owners who have ordered plants from these nurseries have found them to be much more aggressive in spreading. These plants have also retained the shorter growing season of their native area. Although this may not sound like a significant problem, introduction of these genes into local populations could alter the survival or growth characteristics of future generations within a wide geographical area. These plants from different ecotypes may have much different growth characteristics than local populations and are much more likely to become nuisances.

The **BEST** time to introduce desirable plants is when the pond is new. It is more difficult to establish plant populations in older ponds due to depredation from turtles, crayfish, muskrats, and waterfowl. In older ponds,

protective fencing is required for wild celery establishment. Aquatic plants cannot be introduced in the presence of even a few grass carp. Control of other plants, such as cattails and the invasive exotic, reed canary grass, may be required in established ponds prior to introducing bulrush or iris.

Note: The Champaign County Soil and Water Conservation District, an affiliate of the Illinois Department of Agriculture, has hosted an aquatic plant sale for several years. The plants they provide are from stock collected in central Illinois. They can be reached at 217-352-3536 about the timing of their sale and information about the plants they provide. I highly recommend getting three-square bulrush and iris from this source. They sell a few other ornamental and beneficial natives as well.

Additional Information:

anonymous. *Aquatic Plants, their identification and management*, Illinois Department of Natural Resources, One Natural Resources Way, Springfield, Illinois 62702.

Whitley, et. al. *Water Plants for Missouri Ponds*, Missouri Department of Conservation, P.O. Box 180, Jefferson City, MO 65102. (573)751-4115, ext. 325.

Cassani, J.R., editor. 1996. *Managing Aquatic Vegetation with Grass Carp, A Guide for Water Resource Managers*. American Fisheries Society, 5410 Grosvenor Lane, Suite 110, Bethesda, Maryland 20814. (301)897-8616.

Fink, David. *A Guide to Aquatic Plants, Identification and Management*, Ecological Services Section, Minnesota Department of Natural Resources, 500 Lafayette Road, St. Paul, Minnesota 55155. (612)296-2835.

Aquatic, Wetland and Invasive Plant Particulars and

Photographs. <http://aquat1.ifas.ufl.edu/photos.html>
University of Florida, Institute of Food and
Agricultural Sciences.

Questions or Comments:

Fred Cronin, District Fisheries Biologist
618-931-4217
Illinois Department of Natural Resources, 1660 W.
Polk Ave., Charleston, IL 61920.