

ON COURSE WITH NATURE

Grass Carp: Are They Really the Perfect Solution?

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WHAT COULD BE BETTER than eliminating weeds in ponds and reducing the use of costly aquatic weed-control chemicals? Are grass carp, more formally known as sterile white amur fish (*Ctenopharyngodon idella*), really the perfect solution for weed control? Grass carp are growing in popularity and more states are legalizing their use, allowing pond owners to capitalize on the biological attributes of fish that love to eat aquatic plants. But from an environmental standpoint, is it really a good idea to stock ponds with this fish and watch the weeds disappear?

The jury is still out on the use of grass carp. Despite more than 20 years of experience since the introduction of the white amur to the United States by the Arkansas Game and Fish Department, and subsequent legalization of the fish in numerous other states (38 states at the present time), strong concerns remain among some biologists, naturalists, and state regulators that the fish pose a threat to natural resources. For some states, the white amur is outlawed and still considered too questionable to handle.

Even in states that allow stocking of the white amur, the agencies responsible for permit approvals advise that grass carp are not appropriate for some situations, and there are impacts that first must be considered.

What Are the Considerations?

Grass Carp Are Voracious Eaters

These herbivorous (feeding on plants) fish have been known to eat three times their weight in a given day and can reach 75 to 100 pounds. Multiply the numbers and that's a lot of vegetation consumption. When the food supply is plentiful, these fish have distinct vegetation preferences. When food supplies are limited and the pond gets crowded, they are known to eat just about anything. These characteristics make it difficult to stock just the right number of grass carp so as not to upset the balance and impact the natural diversity of vegetation and aquatic organisms.

Identifying Appropriate Stocking Rates

How many fish does it take to adequately control nuisance aquatic weeds, yet still



Triploid grass carp. Courtesy Northeastern Biologists, Inc.

maintain appropriate amounts of vegetation? There are no definitive answers to this question. Recommended stocking rates provided by state fish and wildlife departments range from five to 25 fish per acre. Consideration also must be given to post-stocking mortality and removal by fishermen. The fish are not only good eaters, but they are good to eat as well.

Time is another important factor in maintaining the proper balance. Often, weed control by grass carp is best in the first two to three years after stocking, when the fish are growing. As carp mature, their appetites slow. The tendency is to add more carp at the same rate as the first stocking, resulting in large numbers of fish that need food. Other factors that pose a problem include natural events, such as cold winters, hot summers, and severe water-level changes.

Getting Too Much Vegetation Control

According to Dr. William Haller, University of Florida, the use of grass carp for weed control is often an "all-or-nothing proposition." These fish either control vegetation completely, resulting in complete vegetation eradication, or else they do not consume enough to make a visible difference.

As young fish, they feed on zooplankton, shifting to pond weeds and duckweed. Other

Some Common Aquatic Vegetation Eaten by Grass Carp in the United States

Algae

Filamentous algae*
Cladophora spp.*
Pithophora spp.*

Muskgrass
Chara spp.
Stoneworts
Nitella spp.

Floating Plants

Duckweed
Lemna spp.
Wolffia spp.
Water hyacinth
Eichhonia crassipes
Water fern
Azolla spp.

Emergent Plants

Alligator weed
Alternanthera philoxeroides
Smartweed
Polygonum spp.
Arrowhead
Sagittaria spp.*
Cattail
Typha spp.*
Spikerush
Eleocharis spp.

Submersed Plants

Coontail
Ceratophyllum spp.
Pondweeds
Potamogeton spp.
Naiads
Najas spp.
Watermilfoil
Myriophyllum spp.
Elodeas or waterweed
Elodea spp.
Hydrilla verticillata
Eelgrass or wild celery
Vallisneria americana

*Plants not controlled in colder regions. Fish become less active and do not eat these plants when temperatures drop below 60°F.

Plants Not Eaten by Carp

Algae

Single-celled algae
Asterionell formosa
Others

Floating Plants

Watershield
Brasenia schreberi
White waterlily
Nymphaea odorato

Emergent Plants

Burreed
Sparganium evrycarpum
Bulrush
Scirpus americanus

weeds and sedges are eaten when preferred species are absent. Filamentous algae is reluctantly eaten.

If you are interested in planting vegetation at the water's edge for aesthetics and wildlife benefits, a challenge presents itself as grass carp mature and seek food. The proper number of fish must be maintained or you will lose the plants you added. It is best to understock to avoid too much weed control. Once fish are added, they are difficult to remove. Planting less-desirable vegetation will work for a while, but eventually non-preferred vegetation will be consumed.

Assurance of Sterility and Containment

Most states allow the use of grass carp, but they require special permits and guarantees

that the fish are triploid (sterile). Many states also require that the fish cannot escape the pond and enter into open water systems, potentially threatening the native flora and fauna, including beneficial game fish species. In Florida, a containment device or jail cage mechanism over the water body outlet is required when using grass carp. New Jersey, which recently legalized the use of grass carp, grants stocking permits only for water bodies that have "reasonable containment" characteristics. If your pond is upstream of or near any endangered or threatened species (plant or animal), permit approval is difficult.

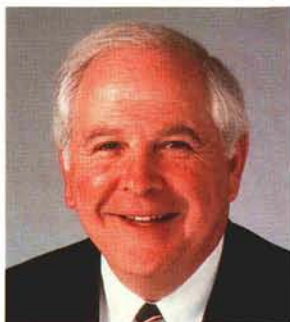
Summary

The sterile grass carp has its place and has been a beneficial method of weed control

on golf courses, but these fish should not be thought of as a magic cure-all for weed problems. They require proper management and analysis of site conditions for successful application.

When you choose to stock a pond or lake with grass carp, you are going to affect the ecology of the water body. Too many carp have a deleterious effect on pond vegetation. Too few grass carp have no effect. Other fish species and waterfowl can be impacted if the grass carp are allowed to significantly alter the balance. Numerous state fish and wildlife service policies allow the use of the grass carp for weed control on golf course ponds, but they advise against total eradication of vegetation. Experts say that finding the proper balance with grass carp is the key to successful results.

Spring News Notes



Thomas W. Chisholm



Raymond B. Anderson

Thomas W. Chisholm Named Green Section Chairman

USGA President Reg Murphy recently appointed Thomas W. Chisholm, a member of the USGA's Executive Committee since 1990, to the position of Chairman of the Green Section Committee. He replaces Raymond B. Anderson, who is stepping down from the Executive Committee after a four-year stint as Green Section chairman.

In his new position, Tom will provide direction to the Green Section's many activities, including its Turf Advisory Service, the Turfgrass and Environmental Research program, the Audubon Cooperative Sanctuary Program for Golf Courses, the *Green Section Record* magazine, and other Green Section publications and programs. He also will serve as chairman of the Green Section's Turfgrass and Environmental Research Committee and the Green Section Award Committee.

Tom Chisholm is no stranger to the Green Section, having served on the Green Section Committee for the past four years. During that time he also served on several other USGA committees and was chairman of the Museum and Library Committee and the Public Links Championship Committee. He is a member of the Bloomfield Hills Country Club in Bloomfield Hills, Michigan.

Sincere thanks and best wishes are extended to outgoing Green Section chairman Ray Anderson, whose tenure included a significant expansion of the Green Section's staff and activities. His support was crucial in obtaining Executive Committee approval of a variety of Green Section activities, including the Audubon Cooperative Sanctuary Program and the revision of the Green Section's green construction recommendations. He also oversaw the recently completed three-year, \$3.2-million Environmental Research Program, the results of which will be released in 1994. Fortunately, Ray has volunteered to remain on the Green Section Committee and will continue to work for the betterment of golf turf. Thanks, Ray!



Dr. Kimberly S. Erusha

Dr. Kimberly S. Erusha Named Director of Education

The USGA Green Section is pleased to announce the appointment of Dr. Kimberly S. Erusha to the new position of Director of Education. Dr. Erusha, who joined the Green Section in 1990 as Manager of Technical Communications, assumed the responsibilities of her new position as of the first of the year.

Among Kimberly's new duties will be the coordination and oversight of the Green Section's educational programs pertaining to the results of its turfgrass and environmental research programs and its other environmental activities. The effort will include the development of educational materials directed at golf course superintendents, regulatory officials, legislators, environmental organizations, and the public at large.

Kimberly will continue her current work as assistant editor of the *Green Section*