

Utilizing Triploid Grass Carp For Aquatic Vegetation Control In Ponds

**Forrest Wynne, Area Extension Specialist for Aquaculture, Kentucky State University Cooperative Extension Program , Graves County Cooperative Extension Service Office, 251 Housman Street, Mayfield, KY 42066-1165.
Phone: (270)247-2334 Fax: (270)247-5193 E-Mail: fwynne@ca.uky.edu**

Grass Carp, or white amur (Ctenopharyngodon idella) were imported from Malaysia to the United States by the U.S. Fish and Wildlife Service in 1963. The fish is native to the river systems of Northern China and Southern Siberia. Grass carp can be an effective biological control agent for some varieties of submerged aquatic soft-stemmed vascular plants and branched algae. In some instances, aquatic plant control has been obtained for periods of 5 to 10 years. Under the proper conditions grass carp may provide aquatic plant control in ponds which is longer lasting, more economical, and is less labor intensive than chemical or mechanical control methods.

Grass Carp are members of the minnow and carp family (Cyprinidae). Members of this family have throat (pharyngeal) teeth which are adapted for chewing the food which is obtained by the mouth. Young grass carp, approximately 4 inches in length or less, feed on small invertebrates and plant material which may include filamentous algae. The diet of larger fish consists almost entirely of soft plant material. A short digestive tract requires grass carp to feed almost continuously when water temperature

The triploid fish is produced by either temperature or pressure shocking the fertilized egg during its maturation process. A coulter counter which is a electronic particle size analyzer, determines the larger triploid fish blood cells from the smaller

exceeds 68 degrees F (20 degrees C). Under ideal conditions, grass carp may consume 2 to 3 times their body weight in plant material per day and gain 5 to 10 lbs per year. The fish may grow to 4 feet in length and weigh up to 100 lbs in their native waters. However, these fish rarely exceed 30 lbs when harvested from ponds.

Large grass carp become very active when trapped in a seine and can be dangerous to handle. Grass carp can survive water temperatures which range from 34 to 95 degrees F (1 to 35 degrees C) and short periods of low dissolved oxygen of 2 to 3 parts per million (mg/l). The fish will not feed when dissolved oxygen is low.

Many states allow the restricted use of grass carp for aquatic weed control. Triploid grass carp are not capable of successful reproduction due to an extra set of chromosomes. These fish are permitted by many states as opposed to the diploid grass carp which have two sets of chromosomes and are physically capable of reproduction. Successful spawning populations of introduced diploid grass carp have been reported in the lower Mississippi River and some rivers in Mexico.

diploid fish cells. This device must be used to determine if each fish has two or three sets of chromosomes when fish are shipped to states where only triploid grass carp are permitted. This screening process is expensive and labor intensive which

accounts for the relatively high cost (\$7.00 to 11.00 each) of the triploid fish. Triploid grass carp are believed to feed and grow at rates similar to diploid fish. Diploid grass carp are known to live 10 to 15 years.

Grass Carp prefer certain varieties of soft stemmed plants and branched algae. Proper plant identification is essential for effective aquatic plant control. Selective and preferential feeding behavior complicates determining which varieties of plants and algae grass carp will effectively consume. Grass carp may eat the soft new growth of more fibrous plants and not consume the more mature portions of a similar plant. As more preferred food becomes scarce, grass carp will eat less preferred types of vegetation. The common names of plants and algae which grass carp are considered to prefer and control are given in table 1.

TABLE 1.

Plants & algae which grass carp are considered to control	
Bladderwort	Naioids
Chara	Hydrilla
Elodea	Spikerush
Fanwort	Widgongrass
Parrotfeather (Myriophyllum)	Coontail (Ceratophyllum)
Pond weeds (Potamogeton)	

The common names of plants and algae which grass carp are considered to be ineffective in controlling are given in Table 2.

Grass carp should be stocked at a

TABLE 2.

Plants & algae which grass carp will not effectively control	
Alder	Rushes
Alligatorweed	Sedges
American lotus	Smartweed
Arrowhead	Spatterdock
Buttonbush	Southern watergrass
Cattails	Torpedograss
Duckweeds *	Water hyacinth
Filamentous algae **	Watermeal *
Fragrant water lily	Water pennywort
Frogbit	Water primrose
Maidencain	Water shield
Pickerelweed	Willows
Planktonic algae	White water lily

** Grass Carp will consume duckweeds and watermeal, but they may not be able to control the populations of these plants.*

*** Filamentous algae may be controlled by grass carp 2-4 inches in length in ponds without predators. Larger fish may consume filamentous algae, but it is not a preferred food and effective control may be unpredictable.*

Grass carp will eat catfish feed but do not consume amounts that are considered significant by catfish farmers. Grass carp are occasionally caught by hook and line particularly when a nightcrawler is used for bait. Similar to other members of the minnow family, grass carp flesh tends to contain many bones but is reported to have good flavor.

minimum of 10 inches in length in ponds

which contain adult largemouth bass. Food consumption and the growth rate of grass carp tend to decline after 5 years of age. Grass carp should be stocked at the recommended stocking rate (Table 3.) and may require supplemental stocking after five years to maintain long-term plant control.

the fish and game department for regulations and a certified supplier list for triploid grass carp.

TABLE 3.

Weed Evaluation	Number of Fish to Stock Per Acre
New pond or very slight weed problem	5
Moderate weed problem (10 to 20% coverage)	10 to 15
Severe weed problem	15 to 20 or more

Grass carp do not interfere with most warmwater game fish, however they may impact fish populations by reducing or eliminating certain varieties of aquatic plants. Efforts to totally eliminate rooted aquatic vegetation should only be made in aquaculture ponds which are harvested by seine. Reasonable amounts of rooted aquatic vegetation are beneficial to most pond environments. The use of copper sulfate compounds as a pond algicide may be potentially lethal to members of the minnow and salmon and trout families. Use of these compounds is not recommended in ponds which contain grass carp particularly in waters with low alkalinities (less than 50 mg/l).

It may be desirable to construct escapement barriers over drainpipes and emergency spillways to prevent grass carp from escaping during periods of pond flooding. However, it will become necessary to routinely clear these barriers of debris to prevent flood waters from washing out the pond's dam. Contact the local county cooperative extension office or