IMPERIAL IRRIGATION DISTRICT

FACT SHEET: Aquatic Weed Control & Sterile Grass Carp

Hydrilla

Hydrilla is a rapidly spreading aquatic plant that has invaded thousands of acres of lakes, rivers and canals throughout the United States. First discovered in Florida in 1960, it has since spread throughout the southeast states and into Texas and California. In the Imperial Valley, hydrilla was first found in 1977 in the All-American Canal, and has since become the most serious water weed problem ever faced by the Imperial Irrigation District. When well established, it will clog canals and municipal water systems, resulting in thousands of dollars of flood damage and removal costs.

Today, hydrilla is the number one aquatic weed problem in the world because of its ability to grow a rapid 10 inches a day during peak growing season. It easily spreads from one body of water to another by means of boats, motors, trailers, bait pails, fishing tackle and even waterfowl. A tiny fragment of the weed can easily grow into a thriving plant once it gets back into water. To help develop methods of combating hydrilla, the IID joined in a cooperative research program with the California Department of Food and Agriculture and the United States Department of Agriculture.

Research

In 1981, the IID research team began a three year study in the mechanical, chemical and biological methods of controlling the 350 miles of hydrilla found in IID waterways. Findings concluded that mechanical methods were temporary and expensive and chemical methods were incompatible with agricultural and fishery use. The biological research method paid handsome rewards and today is the only successful eradication program utilizing biological methods in controlling hydrilla. Research conducted in cooperation with the Coachella Valley Water District demonstrated the economy and effectiveness of using triploid (sterile) grass carp to consume aquatic vegetation. The IID utilizes the sterile variety to avoid adverse impacts to the balance of the environment.

The fish are called "triploid" because a pressure treatment applied to the fertilized egg results in the retention of a third set of chromosomes, instead of the normal two (diploid) in fertile fish. In addition to hydrilla, the grass carp also consume other aquatic weeds such as Sago Pondweed and Eurasian Watermilfoil. In June 1989, the U.S. Department of Agriculture awarded the IID a distinguished service award for outstanding accomplishment in pioneering biological control of hydrilla.

Fish Hatchery

Once the IID decided to indefinitely use grass carp for weed control, a fish hatchery in El Centro was specifically built for the low-cost production of triploid grass carp. The hatchery allows the District to produce their own supply of fish and not have to be dependent on other agencies out of state. Periodically, the California Department of Fish and Game will inspect IID's grass carp for disease and parasites. Shipments of fish imported into California could potentially be denied entry due to disease or parasite infections. The hatchery must also meet specific facility requirements as set forth by the California Department of Fish and Game: security chain link fencing surrounding the facility, high/ low water level alarm systems, birdnetting over all the ponds, and filters to discharge water which helps to eliminate the possibility of fish escaping.

IID's fish hatchery was completed in May 1988 and since then about 10,000 to 20,000 stockable grass carp are produced at the facility each year. Currently, the IID is the only grass carp production hatchery in the Western United States. Given the uniqueness of this hatchery, it has been toured by state and federal agencies, private companies, and official representatives from various countries including Mexico, Spain, Egypt, Colombia, Russia, China and Canada.

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About Grass Carp

Grass carp are sometimes confused with common carp, but the main difference is coloration. Grass carp have a greenish back and white abdomen, while the common variety is orange in color. Grass carp also have a mouth shaped like a trout or bass, and common carp have a sticker type mouth. Grass carp do not have any spines or whiskers and the common type do. When grass carp are first stocked into canals they are about 8"10" long and weigh 0.75-1.0 pounds. As they mature, they grow to be about 25-40 pounds. Some grass carp have even grown to three feet in length and weighing over 40 pounds. Grass carp are fed aquatic plants, grass clippings, and supplemental catfish pellets.

Although fishing is permitted in the Imperial Valley canal system, possession of live grass carp in California is illegal. Possession of grass carp requires a special legal permit granted through the Department of Fish and Game for the sole purpose of aquatic weed control. If you catch a grass carp, you are required by law to return it to the water. Failure to abide by this law may result in fine and/or imprisonment. The current penalty for illegal possession and transport of grass carp is a fine of $5,000 and/or up to one year in county jail.

Fish Stocked

Initially, in the summer of 1985, 7,800 fish were stocked into about 1.5 miles of the All-American Canal. The high stocking rate resulted in the total removal of all hydrilla in that area in about eight weeks. Approximately 99% of all hydrilla have been eliminated from the Imperial Valley as a result of utilizing triploid grass carp. As of January 1998, over 200,000 fish have been stocked into IID's water delivery system. The District's goal is to stock 20,000-25,000 fish each year. The District also stocks fish in private hydrilla infested ponds in the west Imperial Valley. Small (3"-4") grass carp are also donated to the Mexicali Valley's Comicion National de Aqua in cooperation with the USDA-APHIS Latin American Region for the eradication of hydrilla in the Mexicali Valley. All grass carp stocked into California waters must be the sterile, triploid variety. Every fish produced must be given a blood test to determine that it is triploid (having an extra set of chromosomes), and therefore sterile. The District also sells excess fish to California, Arizona, and Nevada. Some fish have been sold to places as far away as Alberta, Canada for research programs there.

Spawning Season

Grass carp normally reproduce in the spring. This is their "spawning season." In late March, diploid grass carp (normal grass carp) are recovered from the ponds and sorted by sex and placed into pools. Starting in early April, two females and two males are brought into the hatchery. Because the grass carp are rivervine fish, their spawning behavior is triggered by springtime conditions: rising water temperatures, changes in water flows, and increasing daylight hours. Since these conditions cannot be reproduced in the hatchery, the fish are artificially induced to spawn through a series of injections.

To produce a sterile, triploid grass carp, an extra series of steps in the spawning procedure needs to occur. First, the eggs are subjected to a pressure treatment after fertilization, which causes the eggs to retain an extra set of chromosomes. Then the fertilized eggs are placed into stainless steel cylinders filled with water, then subjected to 8,000 psi of hydrostatic pressure. The eggs then incubate for about 24-36 hours and then hatch. Initially baby fish receive their nourishment from a yolk sac that is attached to the fish. After 3 days, the babies start feeding and are initially fed hardboiled egg yolks, then commercial fish food along with brine shrimp nauplii (larval stage of the brine shrimp). Baby fish are kept in the hatchery for about one week and then transferred out to larger ponds.

Larger ponds are fertilized to promote growth of zooplankton, which is what baby fish will eat. After two months, the fish grow from about 1/a" to 2"-3" and are large enough to undergo blood testing. At about 1 1/2" grass carp will start eating green plant material along with supplemental commercial catfish pellets. Each fish will undergo blood testing to determine if it is triploid and sterile. A three-person team can test 350-400 fish each hour averaging an 84% triploid rate.

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