

The Aquatic Plant Business In Relation to Infestations of Exotic Aquatic Plants In Florida Waters

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The aquatic plant business is an integral part of the tropical fish-pet industry functioning to supply the demands of the hobbyist for "livestock" in the home or office aquarium. The expansion of this industry during the past forty years has been tremendous. Due to the mild climate in southern Florida and other factors, the state has become perhaps the world's major center for the wholesale segment of the industry. Along with this evolving industry Florida has been subjected to repeated introductions of exotic plants and animals, several of which have become firmly established in our freshwaters. The successful adaptation of several species of exotics to Florida waters and their rapid spread over the state is currently causing much concern among researchers, conservation agencies, and the uninformed general public utilizing such waterways.

I would like to briefly trace the general development of this industry up to the present and then present some challenges.

In the early twenties, the aquarium hobby was in its infancy in the United States. Biological techniques and knowledge, transportation methods, packaging, etc., were primitive in contrast to today. Importations were few and difficult, being dependent upon slow ship transportation. Domestic shipments of live fishes and plants were being made by railway express and mail.

The industry received a strong boost during the period of 1940-46 as a result of contacts made by servicemen in far corners of the world. Techniques of shipping by air in plastic bags, use of anesthetics and antibiotics, adoption of farm pond production techniques for domestically produced fishes, advertising in mass media, permitted the rapid expansion of the total pet industry. The largest category of air-freight moving through the Miami International Airport today is pet industry livestock—tropical fishes, aquatic plants, birds, reptiles, amphibians, and mammals—domestically produced and imported from Asia, Africa, and the Latin American countries. Because of temperature and the necessity of locating near suitable air-freight service, the industry centers extend from the Tampa-Lakeland-Orlando area and from Indian River county to the Miami area. To the present time there have been no regulations, restrictions, nor supervision of this overall industry by government—except as related to income tax, U. S. Customs, and U. S. Plant quarantine restrictions on imports and exports.

Now to return specifically to the aquatic plant business in Florida. During the early development of this segment of the business, a limited number of exotic species were available and mostly these were cultivated on the premises of tropical fish farms. With increasing demand for both native species and exotics, many additional species were imported and introductions were made to the natural waters of Florida. Some of these species introduced to Florida's homoithermal springs and cool water streams and lakes were successful; others with wider ecological valence have become established in drainage canals, roadside ditches,

ponds, lakes, and large rivers. The basic function of these introductions was to enable the operator to have a year-round, free supply and eliminate the high cost of an established nursery. Today, with the successful stocking of native and exotic species of aquatic plants, many individuals and firms are engaged solely in harvesting and shipping these plants within and outside the state. Also, it should be mentioned that there are wild-plant collectors and shippers in Texas, Alabama, Georgia, and North Carolina, some of whom come into Florida for their stock and also engage in stocking Florida waters with species not native. One firm from North Carolina in 1968 stocked over 25 localities in Florida with aquatic plants—some native and some exotic—for future harvest.

During the past decade, several businesses have evolved in the state which deal strictly in cultivated aquatic plants and in direct competition with collectors of wild plants. Prices remain at approximately the same level as prevailed during the depression era of the 1930's. Air transportation has made it possible for a sizeable import of exotics from Africa, Asia, and South America and the industry is constantly searching for additional species to import. There has also evolved an increasing degree of inclusion of non-aquatics in the trade. *Dracena* spp. imported from Puerto Rico, Bella palms, *Aglaonema* spp., *Colocasia* spp., *Spathiphyllum* spp. and many others are currently being shipped in large numbers as aquarium plants. According to the type of plants being sold in the trade today, it becomes increasingly difficult to adequately define an aquatic plant! I would conservatively estimate that over 200 species of exotic plants have been imported into Florida by persons and firms interested in commercial aspects of aquatic plants.

Now I would like to discuss some of the problems and responsibilities confronting the industry and the state of Florida.

Importation of exotic plants classed by the shipper as aquatic pass through U. S. Customs and are inspected by U. S. Plant Quarantine for snails, insects, and other forms known to be deleterious to U. S. Agriculture. Aquatic plant seeds can be imported without any restrictions. Imported plants are not inspected nor restricted in any manner by the State of Florida. They can be and frequently are trans-shipped directly from Florida airports to out-of-state markets.

About three years ago several states recognized aquatic plants and required incoming shipments be certified by the State Agriculture Department of the state from whence shipped. The Plant Industry Division of Florida Department of Agriculture issued certification stamps to Florida shippers with little interest in establishing criteria for inspection and no interest in implementing a constructive program of supervision and assistance.

During my 10 years in the business, I have recognized several serious problems which should also be of interest to the state of Florida:

1. Fungus infestations in imported plants.
2. Introduction of exotic snails by import of eggs on plants and escape to natural waters.
3. Infections of plants by nematodes.
4. Introduction into natural waters of Florida the following plants: *Hydrilla verticillata*, *Egeria densa*, *Elodea canadensis*, *Myriophyllum spicatum*, *Myriophyllum braziliense*, *Hygrophila* sp., *Ambulia* (*Limnophila*) *sessiliflora*, *Ambulia* (*Limnophila*) sp., *Alternanthera philoxeroides*, *Eichornia crassipes*, *Nymphaea* spp.

Where established, all of these species have become dominant except the species of *Hygrophila* and *Ambulia*. A great number of additional species of exotics have been purposefully planted in natural waters and others as escapees from plant farms and tropical fish farms.

Streams which were being treated by state and/or federal agencies for aquatic weed problems were being stocked with native and exotic species by out of state and resident firms. The application of chemicals by government agencies to control exotic weeds resulted in the purposeful stocking of additional areas by individuals to assure them of healthy, harvestable crops.

It should be pointed out that business interests were not directly responsible for several of the aquatics now presenting serious problems in natural waterways. Also, it should be stated that the present rapid spread of most problem species throughout the state is passively being accomplished by the boating public.

At Rainbow Springs a systematic program to prevent establishment of exotic plants has been in effect for 18 months, during which period three infestations of *Egeria densa* were detected early and effectively eliminated.

In Silver Springs this species has propagated unchecked and my predictions are that it will dominate the aquatic plant community within two years time, with dire consequences to the total ecology of the area.

One example of an impending problem of large magnitude is the Cross State Barge Canal. To cite just two species: *Hydrilla verticillata* and *Egeria densa* are currently established in areas of the St. Johns River near that end of the canal and also in the Withlacoochee River on the western end of the canal. It seems almost certain that within a very few years the entire canal system will be completely clogged by one or both of these species for which there is no known practical management control!

These are some of the problems and we should discuss some constructive steps that might or should be taken. I extend the following challenges to the people of Florida:

1 *Aquatic plant industry certification*—That the Florida Department of Agriculture establish criteria and implementation of nursery certification program; initiate research projects directed towards solution of extant pressing problems in the field of aquatic plant pathology; establish and enforce rules and regulations regarding imports and native species—inter and intra state management.

2. That a bill be presented to the U. S. Congress to regulate the importation of aquatic plants into the United States and the movement of plants from state to state.

When 1. and 2. are properly done, this should enable the aquatic plant industry to progress in Florida and perform a necessary legitimate role; and should vastly minimize the future problems of contamination of Florida waters by exotic plants.