

HANDOUT
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NON-NATIVE FISH RESEARCH LABORATORY

Florida Game and Freshwater Fish Commission
Boca Raton, Florida

The Florida Game and Freshwater Fish Commissions' Non-Native Fish Research Laboratory (NNFRL) at Florida Atlantic University (FAU) was established in response to the increasing awareness of non-native fishes within the state and the realization of their potential ecological significance. In the last two years alone reproducing populations of five non-native fish species were reported. In addition to these, 20 other species are known to be reproducing in Florida's waters. Though a serious biological contaminant in and of themselves the presence of non-native fishes is generally indicative of an unbalanced ecosystem brought about by chemical and/or physical alterations.

The primary objective of this laboratory is to collect baseline data on the biology of non-native fishes in Florida and to evaluate their effect on the environment, especially with respect to the native freshwater game fishes. More specifically this entails the compilation of data dealing with environmental requirements and preferences, life histories, impact studies and developing and evaluating techniques for controlling non-native fishes established in Florida.

PHYSICAL PLANT DESCRIPTION

The initial phase of construction at the NNFRL was completed in 197 . A levee (16 feet above sea level) and a 9 foot chain link fence surround the property in hopes of preventing unwarranted escapement of fishes due to flooding and/or poaching. The facility consists of a research building, a small office building, pump house and several earthen ponds. The main research building is a 50'x100' Butler-type metal structure, the interior of which has yet to be completed. When finished this building will house the main offices, a library-conference room, fish museum, wet lab, shop and research areas.

Five 1/4 acre ponds, one 1 1/4 acre reservoir, ten 1/50 acre earthen pools and a 2-3 acre wastewater pond were built contiguously, adjacent the inside perimeter of the property.

A single well and two pumps provide water for filling the ponds and irrigation. Generally, water is pumped into the reservoir and aged, after which it is gravity fed into the other ponds. All ponds with the exception of the wastewater pond, are lined with plastic to prevent seepage thru the porous substrate (sugar sand). Since the wastewater pond is unlined the water in it is gradually filtered thru the sugar sand, back into the water table. Thus, the wastewater pond acts as a trap that collects any fish, parasites, eggs, etc., which escape from the research ponds.

Finally, a state-owned mobile home, located on the property, is provided for the resident biologist. This arrangement allows for 24-hour security and data collection while making low rent housing available to the biologist.

ON GOING RESEARCH

The main research projects underway at the laboratory are: An evaluation of short-termed interactions between native centrachids and selected non-native fish species, determination of lower lethal temperature limits for selected fishes and investigations into the laboratory rearing of the common snook, Centropomus undecimalis. The first project is aimed at evaluating the ecological impact of various non-native fishes on balanced populations of bass and bluegill. In the spring of this year three 1/4 acre ponds were stocked with adult largemouth bass and bluegill. After approximately one year sexually mature South American tigerfish, Hoplias malabaricus, and walking catfish, Clarias betrachus, will be stocked separately into two of the ponds. The third pond will be used as the control pond. Previous work with Clarias in hatchery ponds resulted in only limited reproduction, possibly because of the lack of suitable spawning sites. To prevent this and to more approximate natural conditions, wooden planks were set in shallow water to provide places for Clarias to burrow beneath and spawn. The one year time lag between the introduction of native and non-native species into the ponds is the minimum time necessary to develop a 'balanced' bass-bluegill population. Establishment of a new species in a balanced system is generally more difficult than in an unbalanced system. Using this experimental approach, we expect to generate only negative results, i.e., results which indicate that the non-native species has little or no effect on the native species. If any of the non-native species being evaluated successfully spawn and rear their young to the detriment of the bass and/or bluegill, there will certainly be cause for concern as this may be indicative of what is going on in nature.

The second research project, that of defining the lower lethal water temperatures for selected non-native fishes, will provide valuable data regarding the northern most possible ranges for a given species. To conduct this study it was necessary to design and construct a system in which the temperature could be accurately controlled (within 0.5°C). Our system consists of eight 50 gallon experimental compartments, a 400 gallon cooling reservoir and a 100 gallon sump box. The temperature is controlled in each compartment with individual heaters, thermistors and controller units. The major components of the system were constructed from $3/4$ inch plywood, fibreglassed and painted with epoxy paint. The construction of this system is presently underway and should be completed soon. The lower lethal temperature limits will be identified by lowering the temperature at a predetermined rate, initially $1^{\circ}\text{C}/\text{day}$. As the fish begin to exhibit signs of stress the daily temperature drop will be decreased. Once the lower lethal temperature for a species has been defined, attempts will be made to evaluate other effects of temperature e.g. the effect of rapid vs. gradual changes in temperature drops.

Though primarily concerned with non-native species, this laboratory has recently become involved with a native species, the Florida common snook. Preliminary investigations into the laboratory rearing and use of snook as a freshwater fish management tool were begun several years ago. Naturally occurring snook, collected and stocked into freshwater research ponds demonstrated excellent growth and survival, although they were unable to reproduce. If snook could be produced in large enough quantities, it is expected that this euryhaline species would provide a valuable freshwater sportfishery in addition to assisting other predators in the control of unwanted rough fishes. The primary objectives of this project are to develop and define techniques for the laboratory rearing of snook, identify and document the morphological and behavioral developments of snook from fertilized eggs to fingerlings and to evaluate the effects of various parameters e.g. food type and density, on survival and growth. Using closed, biologically filtered rearing systems we were able to successfully rear snook from fertilized eggs to fingerlings this past summer. To the best of our knowledge this is the first time ever that snook have been reared outside the realms of mother nature.

SUMMARY

The future of Florida's sport fisheries is presently being threatened by physical, chemical and biological contamination of its aquatic habitats. The ever increasing

success of non-native fishes in Florida is, in general, indicative of its deteriorating aquatic ecosystems. Research conducted at the NNFRL has and will continue to provide important answers to some of Florida's unique fishery problems in addition to suggesting means of improving and/or preserving its excellent fisheries resources.

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