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Florida – a watery crossroads for fish

One of the charms of fishing is the chance to spend a few hours relaxing in natural surroundings, far from the pressures of everyday life. However, beneath the calm surface of the water, is a world of coexistence, aggression, and predation involving a diverse cast of characters—fishes, amphibians such as frogs, crustaceans such as freshwater crayfish, mollusks, aquatic insects, plants, and algae. Like a global metropolis, South and Central Florida's wetlands, lakes, and canals today host aquatic creatures from many continents; some native to Florida while others have been introduced by humans. The changing mix of species and environmental conditions pose questions such as—where are recently introduced fishes coming from? How do they interact with native plants and animals? And how do human impacts such as nutrients from fertilizer and resulting algal blooms affect fishes? Dr. Amartya Saha, Ecohydrologist at Archbold says, "These kind of issues need to be explored in order to maintain healthy and diverse aquatic ecosystems and the services they provide, ranging from recreational fisheries to maintaining water quality."

Long before the advent of human settlers, freshwater fishes migrated to Florida from temperate climes farther north. These include bass, sunfishes, gars, bowfins, catfishes and minnows. In recent decades many fish species have been intentionally or accidentally introduced into Florida by humans. Saha explains, "Some fish have been imported as aquarium fish and were subsequently released by pet owners or from an

overflowing aquaculture facility during severe rainstorms. Others were introduced deliberately by Floridians who mistakenly thought we needed more fish species that can be eaten, such as the snakeheads from Southeast Asia, without understanding the very bad effects they would have on Florida's wetlands. All have naturalized in the warm subtropical environment. Some of these exotic fish are aggressive to native fish, and spreading invasively through Florida, while others appear, at least based on current knowledge, to be more benign.”

One such example is the African Jewelfish, a pretty cichlid (a fish family) which was found in recent years in Archbold Station's seasonal wetlands by Dr. Betsie Rothermel. Others, including the Walking Catfish and Blue Tilapia, found their way upstream to beautiful Lake Annie as early as 30 years ago. Lake Annie otherwise is known to support 24 native fish species. Cichlids are maternal mouthbrooders native to tropical regions of Africa, the Americas and Asia. Saha says, “The warm temperatures in Southcentral Florida’s waterbodies provide good conditions for cichlids like African Jewelfish, Mayan Cichlid and Blue Tilapia, which can spread across the landscape via ditches into seasonal wetlands. Ecologists term these ‘exotic invasives,’ usually in a negative sense, because cichlid males compete with native sunfishes to stake out territories to build and guard nests. In addition, African Jewelfish are very aggressive, nipping the fins and tails of sunfishes and driving them away. In time, native sunfish populations can decline in areas where cichlids establish. Fortunately, most tropical cichlids cannot withstand prolonged freezing temperatures and hence have not yet spread north of Central Florida.”

From the Amazon basin comes several types of armored catfishes – Brown Hoplos and an aquarium favorite – the algae-grazing Plecostemus. The ‘pleco’ quietly hangs out stuck to aquarium walls or plant stems, its mouth usually busy munching algae. However, plecos have been seen burrowing into muddy banks, eventually weakening them. Another invasive catfish from Southeast Asia – the Walking Catfish - can crawl across Florida's flooded fields, pastures, and even woods and prairies and survive for hours out of the water, being an air-breather. Saha says, “While these non-native catfishes coexist peaceably with other fish in aquaria, much less is known about their effects on wetland ecosystems. For instance, might these catfishes compete with the native catfishes, such as the Channel Catfish or Brown Bullhead, for food and space?”

Periodic monitoring of fish communities can provide a window to these or other changes. For example, monitoring of seasonal wetlands at Archbold Station by Dr. Betsie Rothermel over the last 8 years has revealed continued presence of Brown Hoplos and Walking Catfish and the arrival and significant increases in African Jewelfish. Since Archbold does not use fertilizer or pesticides (that can favor invasive fish over native fish), it is likely that recent years with intermittent high water conditions, and not pollution or high levels of nutrients and algal blooms, is most likely to have facilitated the movement of these fish from regional canals, ditches, and, rivers, into Archbold's wetlands.

Because of the vast number of water bodies in Florida, citizen science is critical to monitoring for invasive fish. If you find an unusual-looking fish, check out the species

photos on the FWC website (<http://myfwc.com/wildlifehabitats/nonnatives/>) and follow their link to report it. The U.S. Geological Survey's Nonindigenous Aquatic Species website (<https://nas.er.usgs.gov/default.aspx>) is another good resource to find out which exotic species occur in Florida and to report new sightings. Please never release aquaria fish or non-native fish into Florida waters, you may accidentally introduce a new fish that could devastate local lakes and rivers. Public involvement is essential to help maintain healthy aquatic ecosystems and the services they provide us for the next generation.

Photo 1: South American Armored Catfish (Plecostemus) caught from an irrigation ditch on a ranch in Highlands County. Photo by Amartya Saha.



Photo 2: A native sunfish from a Highlands County Ranch irrigation ditch. Photo by Amartya Saha.



Photo 3: An African Jewelfish (*Hemichromis letourneuxi*) found in a seasonal wetland at Archbold Biological Station.

