

Conservation Corner: Discover American Killifishes

These interesting and colorful native fish deserve a second look.

By Joshua Wiegert and Robert Rice

From the 26th through the 28th of May, hundreds of killifish fans will descend upon Florida. The Suncoast Killifish Society will host the American Killie Association's 2006 Convention. This issue should be reaching stands sometime around late April or early May 2006, so Robert and I figured we'd whet our reader's appetites for killies a little bit.

Killifish are a truly diverse group that is greatly underappreciated by hobbyists. They range from tiny species that barely reach 1 inch in length yet are bursting with color to enormous 7- to 8-inch-long torpedo-shaped fish. They can be found in virtually any habitat, from oceans to desert pools that dry up for part of the year to nearly unlivable swamps.

One of a Kind

Many unique killifish attributes are fairly well known. They have a reputation for living very short lives, which, by the way, is not necessarily true. Some species are annual species — the entire population dies each year, only to emerge from eggs buried in dried sediment the next time it rains.

Killifish also include the only known example of a self-fertilizing vertebrate species, the mangrove killifish. Virtually all are female (though some males occasionally appear) and reproduce through parthenogenesis. Many species of killifish have tiny ranges, smaller than virtually any other species, occurring only in a single tiny pool. This tiny range is not at all unusual for killifish.

While not all killifishes are annual, the unique behavior of laying a dormant egg in a pool that will stand the hot summer heat is fairly well known. While most killie eggs are fairly sturdy, this behavior is not known from any North American species, occurring only in tropical species. This behavior can put the killies at risk. While their pools lay dry, they can be paved over and converted to parking lots — all without the developer ever realizing a pond was there.

This danger is not unique to killifishes. Many species of insects and other invertebrates, amphibians and plants rely on pools that may be dry part of the year. It can be easy to forget that these seasonal or vernal pools can be an integral part of the ecosystem. Too often, they are drained, filled or converted to permanent bodies of water that will no longer support a seasonal ecosystem.

Endangered in Devil's Hole

The best known of these is undoubtedly the Devil's Hole pupfish (*Cyprinodon diabolis*). These pupfish occur only in Devil's Hole, a natural desert pool smaller than a hotel swimming pool. This fish was one of the earliest animals listed under the Endangered Species Act, leading to controversy around Devil's Hole. Water demands in the desert (burgeoning Las Vegas 90 miles to the south for one) threatened to lower water levels enough to ruin the only habitat for the Devil's Hole pupfish.

Developers and farmers in the area wanted the water, while conservationists wanted the fish. A heated, emotional argument followed, with bumper stickers proclaiming either "Kill the Pupfish" or "Save the Pupfish." One serious news report went so far as to suggest that the entire argument could be solved with a handful of rotenone (a fish poison).

The Devil's Hole pupfish won out in federal court and was considered fairly secure — barring any disaster that might wipe out the precariously small population in the pool.

Unfortunately, as recently reported in the Los Angeles Times (February 6, 2006), the survival of this particular species of pupfish is now in question. Besides groundwater pumping issues, a flash flood washed several empty glass-jar fish traps into Devil's Hole on September 11, 2004. Roughly 80 *Cyprinodon diabolis* were accidentally caught and killed. This has severely impacted the Devil's Hole population, which is now counted below 80 individuals. Their long-term survival is now in doubt.

Other Pups

There are several other species of pupfish scattered throughout many other pools and creeks in the area, however. Many of these are threatened not only by continued water use, but by the more pernicious threat of invasive species. Various aquarium fishes have been released into the area and are outcompeting the pupfishes. These include swordtails, mollies

and platys as well as a handful of tetras.

While some of these may have been aquarium releases, unscrupulous fish farmers, hoping to save on the cost of artificial-rearing ponds, stocked many of the invasives. Other introduced species include bass — illegally stocked by anglers with the obvious effect — bullfrogs and crayfish, both of which eat pupfish and disrupt the natural equilibrium in a habitat.

Top Minnows

The desert pupfishes, however, include just a small portion of the North American killies. Most of our native killies are much more adaptable and able to persist over a large range. These are principally the “top minnows” and relatives. They are somewhat underappreciated by hobbyists, despite the fact that a native killifish (*Lucania goodei*) took best of show in last year’s AKA show.

The topminnows are all contained in the family Fundulidae, including the genera *Fundulus*, *Lucania*, and *Leptolucania*. Other native killifishes include the pretty American flagfish (*Jordanella floridae*), the diamond killie (*Adinia xenica*), the two Florida killifish and a handful of widespread pupfish (*Cyprinodon* spp.).

Marine Killies

The American flagfish is undoubtedly the best known of these. This beautiful little fish is native to southern Florida, where it is readily collected from many bodies of water. Males are incredibly colorful, covered with red stripes and blue stars (hence the name). Some hobbyists report that the males can be a little aggressive with each other, but this is a problem I’ve never experienced. They are easily spawned with one male to two females and will breed among plants or spawning mops.

Flagfish are similar in body form and shape to the beautiful Florida killifish. These fish are found in very hot, salty water, typically in tidal or mangrove pools. They will handle normal seawater just fine but cannot tolerate freshwater. These are beautiful gold fish which must truly be seen to be appreciated. They present an interesting challenge for anybody looking for an interesting species to put in a saltwater aquarium.

The diamond killie (*Adinia xenica*) is likewise an interesting brackish or saltwater fish. It has a slightly larger range than the previous species, occurring from Florida west throughout the Gulf of Mexico. It is a beautiful, angular fish with thin striping. Occurring in mangrove forests, it would be an interesting species to display in a mangrove aquarium.

More Killies

Our smallest killifish is the pygmy killie (*Leptolucania ommata*). These fish barely reach an inch, challenging the least livebearer (*Heterandria formosa*) for the title of smallest native fish. They are a lovely gold color, with bright yellow fins and black marks across their bodies. They are very peaceful and will breed readily among aquatic plants. You can set up a beautiful microdisplay in a filtered desktop aquarium using these, least livebearers and pygmy sunfish.

The related *Lucania* are a bit bigger than the pygmy, reaching 2 to 3 inches in length. These are the bluefin killie (*Lucania goodei*) and the rainwater killie (*L. parva*). Both are found in the southeastern United States. *Lucania goodei* is far more common in freshwater, and *L. parva* is found more commonly in brackish or saltwater. Both are small, beautiful killies that are easily maintained in even small aquaria. *Lucania goodei* is particularly beautiful with its stunning blue fins.

The most commonly encountered *Cyprinodon* is probably the sheepshead minnow (*C. variegatus*). A brackish species, it is commonly sold as a baitfish along the Atlantic coast. It is a very peaceful and beautiful fish with gorgeous, dark fins and blue and gold spangles. It readily adapts to freshwater. They are voracious eaters and not at all difficult to keep. I have found sheepshead minnows to be some of the hardiest fish around. For example, after a day of fishing on the Long Island Sound, some sheepshead that had been stored in a bucket all day later survived happily in an aquarium.

Fun With Fundulus

Of the *Fundulus*, the best known is undoubtedly the mummichog (*F. heteroclitus*), which occupies a similar ecological role as the sheepshead minnow. It is a brackish fish, commonly encountered along the Atlantic and Gulf coasts. They are probably the most predominate fish along the coastline. They are an important forage fish for many larger species. In aquaria, they are pugnacious and attractive. They also share the title of the world’s hardiest fish with the sheepshead minnow.

The truly freshwater *Fundulus* are usually described as either topminnows or studfish. They are occasionally called pike-minnows, in reference to their angular shapes, but this common name is correctly applied only to a group of the large true minnows (*Cyprinidae*).

Aquarists are undoubtedly familiar with the golden topminnow (*F. chrysotus*). They began appearing in mainstream aquaria some time ago, under the dubious name of “golden wonder killie.” This is the classical *Fundulus* form: angular and torpedo shaped. Like many *Fundulus*, they show marked sexual dichromatism. Males are a beautiful gold that has to be seen to be appreciated, while the females are, well, there’s no polite way to say it — really ugly.

Fundulus have an extremely wide range. They occur throughout the continent with various species found from New York to California. They are found in marine, brackish and freshwater habitats, though I’ll just review the more common freshwater ones here. They are found in virtually any habitat one can imagine, though they tend to prefer quiet and weedy areas. *Fundulus* can be occasionally found at bait shops, though they tend to avoid the more typical bait-collection methods. Dipnetting tends to be the most productive method of capture these small fish, but seine hauls and floating minnow traps will recover a few.

The banded killifish (*F. diaphanus*) has a vast range covering most of the northeastern United States west through the Great Lakes. It has a golden sheen with vertical bars across most of its body. It reaches a maximum size of about 3 to 4 inches. In the western United States, one may find California killifish (*F. parvipinnis*). They are predominately shore fish and found in waters in the southern half of California. It is a truly beautiful fish and reportedly rather hardy. California state laws are rather restrictive on the collection of native fish, so it may not be possible to collect any, but check to make sure.

The northern and southern studfish (*F. catenatus* and *F. stellifer*, respectively) are similar looking fishes that occur in the Midwest through the Southeast. The northern studfish is larger, reaching 6 to 7 inches. Males can be somewhat aggressive toward each other, but their color is well worth this potential problem.

Hopefully, this and the accompanying photos will spark a bit of interest in some of our native killies. While many remain imperiled, there are many beautiful killies that are available to hobbyists. There are many native killiekeepers within the ranks of both the American Killifish Association and the Native Fish Conservancy (and plenty who are in both). Be sure to Google either organization for more information on these beautiful fishes.