

A FISHY ENIGMA CALLED PIRATE PERCH



Don Orth

Blacksburg, Virginia

The Pirate Perch *Aphredoderus sayanus* (Gilliams 1824) is a small, but distinctive fish. Jacob Gilliams (1782–1868) first described the species from one specimen caught from a pond near Philadelphia, Pennsylvania. Gilliams placed it in the genus of threadfin breams, *Scolopsis*, described by Georges Cuvier, but thankfully Gilliams was wrong. Pirate Perch was later assigned to the monotypic genus *Aphredoderus*, a genus name that is so much more descriptive and meaningful.

First, let's discuss the name. Early ichthyologist Charles Abbott (1843–1919), after observing them eating only other fishes in aquaria, gave the fish its common name: Pirate Perch. The genus name *Aphredoderus* translates literally to “excrement throat.” French Biologist, Charles Lucien Bonaparte (1803–1857), was responsible for the more meaningful family and genus name. Gilliams wished to make a tribute to naturalist Thomas Say (1787–1834) with his species description. In a twist of fate, the Latin suffix, “anus” usually indicates a relationship of position, possession, or origin. Therefore, when Gilliams translated “belonging to” and “Say” into Latin, the species name became *sayanus*. Legions of ichthyology students remember this scientific name by reciting “Say Anus” or “Say Anus Under Throat” without giving appropriate tribute to Thomas Say, the father of American entomology and conchology.

Upon first collecting a Pirate Perch, its dark brown or olive gray coloration with black speckles makes it very distinctive. It also has a unique, narrow vertical dark bar on its tail fin and under the

eye. Young are dark, almost black. Breeding adults may be violet or purple, whereas non-breeding adults are pinkish with dark olive pigments. It is distinguishable by its shape, coloration, single dorsal fin (usually III–IV spines, 10–12 rays), serrated preopercle bones, and large mouth with projecting lower jaw. The lateral line system is best developed in the head region, and cutaneous sense organs are also highly developed. Its most unusual characteristic is the location of the cloaca, or urogenital opening: it is far forward, actually located in the throat region. Larval Pirate Perch, however, have a urogenital opening further back like a typical fish, reminding us that “ontogeny recapitulates phylogeny” is sometimes correct. Here I address several frequently asked questions about this fascinating fish.

Where do Pirate Perch live? These fish occur in rivers of Atlantic and Gulf slopes, Mississippi, and parts of the Great Lakes basin. The coastal plain portion of the Pirate Perch's distribution overlaps with distributions of many fine fishes, such as the Redfin Pickerel *Esox americanus*, Bowfin *Amia calva*, Tadpole Madtom *Noturus gyrinus*, and Swamp Darter *Etheostoma fusiforme*.

Aphredoderus is part of a large monophyletic group, the Paracanthopterygii, a diverse superorder of marine and freshwater fishes that include cods, grenadiers, hakes, anglerfishes, cusk eels, pearlfishes, brotulas, and trout-perches. Ichthyologists Peter Moyle and Joseph Cech (2004) describe this group as the “odds and cods” in reference to the many odd characteristics among the group members. Ancestors of the Pirate Perch likely emerged in North America after the Cretaceous–Paleogene extinction event at a time (~66 million years ago) when sea levels were higher, and this unique lineage continued to adapt to changing coastal plain habitats as sea levels dropped.

Why the forward-facing urogenital pore? This odd trait has been a subject of much speculation. Do the grooves direct ova from the vent into the left and right gill chambers? Do they incu-



Pirate Perch. (Photo by Scott Smith)

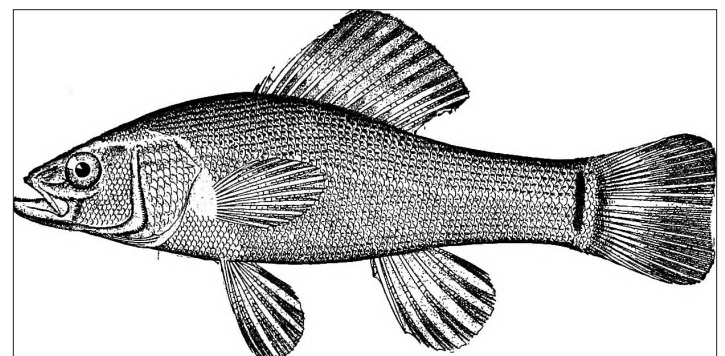


Illustration of the Pirate Perch from *The Fishes of North Carolina*, Smith 1907.

Don Orth is the Thomas H. Jones Professor of Fish and Wildlife Conservation at Virginia Tech University. He is a fellow and life member of the American Fisheries Society, an innovative and award-winning instructor, and scholar with expertise in in-stream and environmental flows, fish conservation and restoration ecology, and freshwater habitat conservation.

bate fertilized eggs in gill chambers? Do they deposit eggs in root masses? Does it make defecation quicker? Observations on breeding behavior have been made from captive Pirate Perch in aquaria, but until recently no in situ observations had been reported.

Pirate Perch are nocturnally active and difficult to observe in the wild. Boltz and Stauffer (1986) and others speculated that Pirate Perch were branchial brooders; however, reports on breeding differ. Brill (1977), Katula (1991), Fontenot and Rutherford (1999), and Hemdal (2003) suggest that females release eggs over vegetation and detritus. Poly and Wetzel (2003) first documented transbranchial (i.e., “through the gill chamber”) movement of gametes of both sexes directly from the urogenital pore through the branchial and buccal (oral) cavities. One study by Fletcher et al. (2004) reported that Pirate Perch spawned in underwater tree root masses. This study was made possible by a remote camera system with infrared lighting. It was the first documentation of root-mass nesting behavior in any species of North American fish. Also, of biological interest was the burrowing behavior of dobsonfly larvae and salamanders, which created tunnels through the dense root masses. The tunnels permit the Pirate Perch to deposit eggs deeper within the root mass. Apparently, the breeding males defend territories by plugging openings to oviposition sites (Fletcher et al. 2004). Questions are not fully answered and Pirate Perch researchers are needed! Tiemann (2004) described behavior of Pirate Perch that “ventured outside its refuge approximately to the point that only its head and anus were exposed, defecated, and then backed into its refuge.” This behavior is similar to that observed by pearlfish (Carapidae), which has its anus located near its isthmus.

Why is there geographic variation in lateral line development? The lateral line of Pirate Perch is better developed in populations along the Atlantic Coast compared with Midwest populations. Ichthyologists George Moore and William Burris described the extensive, complex lateral-line system of the Pirate Perch in 1956. The exposed neuromasts of the head region occur in a unique ridge formation. Yet, evolutionary pressures associated with this geographic variation have not been investigated. *Aphredoderus s. gibbosus* Lesueur 1833 and *A. s. sayanus* have been accepted as subspecies for a long time (Boltz and Stauffer 1993).

What habitats are essential to viable populations? Pirate Perch are found in lowland streams, rivers, ponds, and backwaters associated with bottom-land hardwood wetlands. They are more often associated with pools and undercut banks where woody

debris accumulations create complex cavities, reduced flow, and trap leaves. These habitats provide an abundance of macroinvertebrates, an important food source for the nocturnally active Pirate Perch. These floodplains are also among the most threatened ecosystems (Batzer et al. 2018).

What are the threats to Pirate Perch? Because of their small size, Pirate Perch are readily eaten by piscivorous fishes (pickerel, bass, and large sunfish) and water snakes. The complex habitats created by dense vegetation or woody debris accumulations in un-channelized streams and lakes in bottomland hardwoods are essential to sustain Pirate Perch populations. Insects on snags also made up more than 60% of the Pirate Perch diet of midges and caddisflies (Benke et al. 1985). Grass shrimp dominated the diet in an Arkansas study (McCallum 2012). Ditching, draining, and channelization have likely reduced many Pirate Perch populations. Urbanization resulted in dramatic reductions in Pirate Perch abundance (Weaver and Garman 1994). Pirate Perch are considered endangered in Ohio, special concern in Iowa, Minnesota, and Wisconsin, and extirpated from Pennsylvania. I encourage you to try dragging a dipnet through aquatic vegetation and mud in any shallow waters and see if you can catch this “poop throat.”

Can I eat Pirate Perch? Although larger specimens can be caught by hook and line, they are not valued as a sport or food fish. The largest specimens are only 5–6 inches. They do persist well in captivity and are popular among native fish enthusiasts. NANFA members have written a number of articles to help those who want to breed Pirate Perch in captivity (Brill 1977; Katula 1991; Wetzel and Edwards 2014).

My final fun fact about the enigmatic Pirate Perch is the discovery that Pirate Perch are capable of chemical camouflage such that its prey is unable to detect their presence via chemoreception (Resetarits and Binckley 2013). Whereas, many colonizing aquatic organisms (whether immigrating or ovipositing) recognize and actively avoid habitats containing fish, Pirate Perch blend in with non-visual habitat components. However, we don't yet understand how they become ghosts.

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Ventral view of the Pirate Perch. (Photo by FredlyFish4. Cropped from original: https://upload.wikimedia.org/wikipedia/commons/e/e1/Aphredoderus_sayanus_ventral_side.jpg)

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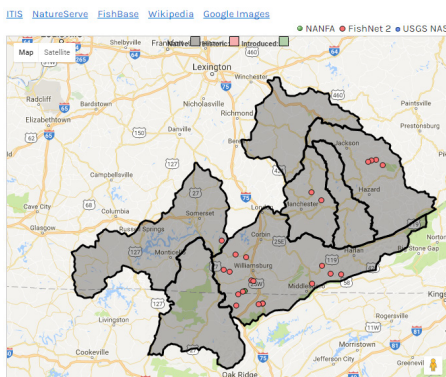
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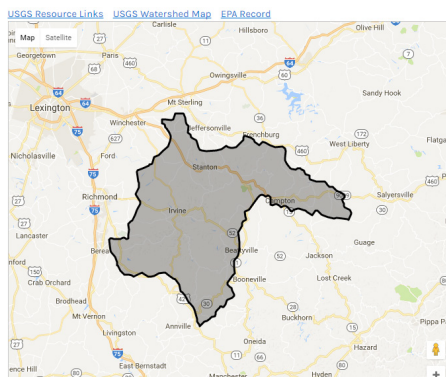
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FishMap.org is sponsored by NANFA. Users can submit their own data to the portal to help map species distribution, so FishMap.org has been working with NANFA members to create an additional database of fish sightings and collections (currently nearly 30,000 records and growing).

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