Percopsiformes

(Troutperches and relatives)

Evolution and systematics

The oldest fossils date back to the Paleocene Paskapoo Formation (between 60 and 62 million years ago) in western Canada. The Percopsiformes may be related remotely to the codfishes (Gadiformes) and troutfishes (Salmoniformes). One point of controversy about their phylogeny is that they show primitive conditions, such as the presence of an adipose fin, which suggests character reversal in their evolutionary history. The monophyly of this group has been questioned. Murray and Wilton proposed removal of the amblyopsid family from the group and created a new order: Amblyopsiformes.

There are two recognized suborders. The first, the Percopoidoi, is characterized by the presence of an adipose fin and a complete lateral line. The suborder is represented by one family: Percopsidae, or troutperches, with one genus and two species. The second, the Aphredoderoidi, is characterized by the absence of an adipose fin and includes two families: Aphredoderidae (pirate perch, one species) and Amblyopsidae (swampfishes and cavefishes, four genera and six species).

Physical characteristics

These are small fishes (less than 8 in, or 20 cm) with a mosaic of primitive characters, such as an adipose fin, and advanced characters, such as a pelvic girdle located farther back from the cranium compared with most other fishes. They also have fewer fin spines and ray-supported dorsal and anal fins, each usually with one to four anterior soft spines. If pelvic fins are present, they are located in a position below the abdomen and behind the pectorals, with three to eight soft rays. The body is covered with cycloid or ctenoid scales.

Distribution

The troutperches are distributed in North America from Alaska and the Great Lakes drainage to the southern and eastern United States.

Habitat

All species are freshwater, with two species found in swamps, one as a facultative cave dweller. Four species are obligatory cavernicolous (cave dwellers).

Behavior

Besides the fact that all species are solitary, little is known about their behavior. The exception is certain types of behavior studied among cavefishes. At least two of the noncavernicolous species are nocturnal.

Feeding ecology and diet

Members of this order are opportunistic predators that eat a variety of food items; at least one species is cannibalistic. Percopsiformes are preyed upon by other fishes, water snakes, and fish-eating birds. Fish larvae may be preyed upon by aquatic insects. Cavefishes are not generally preyed upon since they are the top predators in their habitats.

Reproductive biology

They are oviparous, but nothing else is known at the family level. Spawning (at least for the noncavernicolous species) takes place in the spring. Fecundity tends to be low.
Conservation status

The IUCN Red List includes four species from this order, all of which are cave-dwelling species from the family Amblyopsidae. *Speoplatypterus poulsoni* is listed as Critically Endangered, while *Amblyopsis rossae*, *A. spelaea*, and *Typhlichthys subterraneus* are listed as Vulnerable.

Significance to humans

Some species can be found in both the commercial trade and public aquaria. Cave species have been important in understanding evolutionary issues.
1. Alabama cavefish (Speoplatyphinus poulsoni); 2. Ozark cavefish (Amblyopsis ossea); 3. Swampfish (Chologaster compta); 4. Spring cavefish (Forbesiichthys aemus); 5. Southern cavefish (Typhlichthys subterraneus); 6. Northern cavefish (Amblyopsis spelaea); 7. Sand roler (Percopsis transmontana); 8. Troutperch (Percopsis omiscomaycus); 9. Pirate perch (Aphredoderus sayanus). (Illustration by Emily Damstra)
Species accounts

Ozark cavefish
*Amblyopsis roseae*

**FAMILY**
Amblyopsidae

**TAXONOMY**
*Typhlichthys roseae* Eigenmann, 1897, “caves of Missouri.”

**OTHER COMMON NAMES**
None known.

**PHYSICAL CHARACTERISTICS**
Grows to 2.56 in (6.5 cm). Pinkish-white in coloration. The eyes are not externally visible because they have only vestigial tissue under the skin. This fish also lacks pelvic fins.

**DISTRIBUTION**
This species can be found at 41 sites on the Springfield Plateau, over seven counties in three states: southwest Missouri (20 sites), northwest Arkansas (10 sites), and northeast Oklahoma (11 sites). (The verified historic range was larger.)

**HABITAT**
Individuals of this species are found mostly in small care streams with a chert or rubble bottom, in pools over a silt and sand bottom, or in larak windows or wells, but never too deep.

**BEHAVIOR**
Almost nothing is known about their behavior.

**FEEDING ECOLOGY AND DIET**
Stomach contents have been found to contain copepods, which constituted about 78-90% of the contents by volume; the balance was primarily small salamanders, crayfish, isopods, amphipods, and young of their own species. Most individuals grow between April and October. Cannibalism does not always occur in this species.

**REPRODUCTIVE BIOLOGY**
Breeding habits are not well understood. They have an extended spawning season, with a peak in late summer. The maximum life span is four to five years. Growth is sporadic.

**CONSERVATION STATUS**
Classified as Vulnerable by the IUCN and as Threatened by the U.S. Fish and Wildlife Service.

**SIGNIFICANCE TO HUMANS**
Of particular scientific interest because it is a cave species.

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Northern cavefish
*Amblyopsis spelaea*

**FAMILY**
Amblyopsidae

**TAXONOMY**
*Amblyopsis spelaea* DeKay, 1842, Mammoth Cave, Kentucky, United States.

**OTHER COMMON NAMES**
German: Nördlicher Höhlenfisch.

**PHYSICAL CHARACTERISTICS**
The species grows to 4.33 in (11.0 cm). They are pink-white in coloration. The eyes are not externally visible because they have only vestigial tissue under the skin. The pelvic fins are rarely absent; when present, they are always very small. They have a large, broad head.

**DISTRIBUTION**
Individuals of this species are found in about 100 caves in Kentucky and southern Indiana. Based on field observations, Keith suggested that the species distribution may be limited by competition with the southern cavefish, *Typhlichthys subterraneus*.

**HABITAT**
Their typical habitats are caves and subterranean passages of well-developed karst terrain. Can be found on consolidated mud-rock substrates in shoals and silt-sand substrates in pools but more often in caves with uniform silt-sand substrates.

**BEHAVIOR**
They respond to light by moving away (scotophilia).

**FEEDING ECOLOGY AND DIET**
They feed on benthic crustaceans and worms but can live for two years without food because of their low metabolic rate. They are considered a top predator.

**REPRODUCTIVE BIOLOGY**
These fish have external fertilization, and spawning takes place during high water between February and April. They have a low reproduction rate. The females brood eggs in the gill cav-
ity for about two to five months. The young appear in late summer and early fall.

**CONSERVATION STATUS**
This species is classified as Vulnerable by the IUCN. It occupies a highly restricted habitat and is susceptible to any disturbance in the water, such as groundwater pollution, sedimentation, runoff, impoundment, quarrying, and overcollecting.

**SIGNIFICANCE TO HUMANS**
Of particular scientific value as a cave species.

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**Swampfish**
*Chologaster ornatus*

**FAMILY**
Amblyopsidae

**TAXONOMY**
*Chologaster ornatus* Agassiz, 1853, "ditches of the rice fields in South Carolina."

**OTHER COMMON NAMES**
None known.

**PHYSICAL CHARACTERISTICS**
Grows to 2.86 in (6.8 cm). These fish are strongly bicolored—dark brown above and white to yellow (creamy white) below. They also have three narrow black stripes on each side and an orange or yellow cast to the head. The head is depressed, with small eyes. Pink gills are visible through the unpigmented gill covers. The cycloid scales are embedded, and the fish lack pelvic fins.

**DISTRIBUTION**
This species is found in North America on the Atlantic Coastal Plain from the Roanoke River drainage in Virginia to the Altamaha River drainage in Georgia (United States).

**HABITAT**
They occur year-round on vegetation and debris in low-lying swamps, ponds, ditches, sloughs, and quiet pools and backwaters of streams, usually in well-shaded, small bodies of waters. The chemical nature of these waters is acidic and boglike. Often this species does not show in many faunal surveys; its sensitive response to touch (thigmotaxis) makes it difficult to find in the roots and debris of its preferred habitat along the edges of submerged weed banks.

**BEHAVIOR**
This species is largely nocturnal.

**FEEDING ECOLOGY AND DIET**
Feeds on midge larvae, ostracods, and copepods. Vulnerable to dragonfly nymphs, larger fishes, water snakes, and fish-eating birds.

**REPRODUCTIVE BIOLOGY**
They spawn between early March and mid-April and usually die after spawning. They lay up to 450 eggs and may live as long as two years.

**CONSERVATION STATUS**
Not listed by the IUCN.

**SIGNIFICANCE TO HUMANS**
Sometimes found in the aquarium trade.

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**Spring cavefish**
*Forbesia agassizii*

**FAMILY**
Amblyopsidae

**TAXONOMY**
This species originally was described under two names: *Chologaster agassizii* and *Forbesia agassizii* Putnam, 1872, a well in Lebanon, Wilson County, Tennessee, United States. The genus *Forbesia* was eventually adopted since *Forbesia* was already in use for marine animals known as tunicates.

**OTHER COMMON NAMES**
None known.

**PHYSICAL CHARACTERISTICS**
Grows to 3.54 in (9.0 cm). This species is dark brown to nearly black on the dorsum, grading to lighter brown laterally; it is cream yellow ventrally, often with a thin yellow stripe along each side. These fish have minute scales embedded under the skin. They lack pelvic fins and have pairs of sensory papillae midlaterally and scattered clusters called neuromasts on the head.

**DISTRIBUTION**
Found in central and western Kentucky (west to the Tennessee River) to southern central Tennessee and west across southern Illinois to southeastern Missouri. When the Mississippi River changed its course, the Missouri population may have been isolated from the others for about 2,000 years. It was intentionally stocked from southern Illinois sites to establish a population near Quincy College. This population was intended to serve as a nearby source of fish for research.

**HABITAT**
Individuals of this species are active in springs at night, almost always near the surface; they usually retreat underground during the day.
BEHAVIOR
The few individuals that venture into the spring portions of their habitat may have a strong tendency to move against the current (thetoxist) for periods of half a minute to one minute, but they typically slow strong thigmotaxis and hide under rocks or debris. They prefer highly oxygenated over less oxygenated water but respond to light by moving away (escophily). They tolerate a wide range of temperatures.

FEEDING ECOLOGY AND DIET
They feed at night on amphipods, midge larvae, tiny worms, and microcrustaceans.

REPRODUCTIVE BIOLOGY
Spawning takes place in February. The life span is about three years.

CONSERVATION STATUS
Not listed by the IUCN.

SIGNIFICANCE TO HUMANS
It has no particular significance except for its ecological and scientific value in researching the process of cave colonization.

Southern cavefish
Typhlichthys subterraneus

FAMILY
Amphbyopidae

TAXONOMY
*Typhlichthys subterraneus* Girard, 1859, a well near Bowling Green, Warren County, Kentucky, United States.

OTHER COMMON NAMES
None known.

PHYSICAL CHARACTERISTICS
Grows to 3.54 in (9.0 cm). They are pinkish in coloration and have a large, broad head. The eyes are not visible, being only vestigial in nature and covered by skin. Other defining characters include seven to 10 dorsal soft rays, seven to 10 anal soft rays, 10 to 13 caudal rays, and 28 to 29 vertebrae.

DISTRIBUTION
This species is found in the subterranean waters of two major disjunct ranges separated by the Mississippi River: the Ozark Plateau of central and southeastern Missouri and northeastern Arkansas and the Cumberland and Interior Low Plateaus of northwestern Alabama, northwestern Georgia, central Tennessee and Kentucky, and southern Indiana.

HABITAT
They are found in caves near the water table.

BEHAVIOR
They do not respond to light.

FEEDING ECOLOGY AND DIET
Eats many on copepods, amphipods, isopods, insects, and worms.

REPRODUCTIVE BIOLOGY
Breeding probably occurs in late spring in association with rising water levels, and spawning takes place between April and May. The females lay fewer than 50 eggs each. They grow slowly and can live up to four years.

CONSERVATION STATUS
Classified as Vulnerable by the IUCN.

SIGNIFICANCE TO HUMANS
They are of particular scientific value as a cave species.

Pirate perch
*Aphredoderus sayanus*

FAMILY
*Aphredoderidae

TAXONOMY
*Subphryius sayanus* (Gilliams, 1824), fishponds, Harrowgate, “near Philadelphia.” Two subspecies have been proposed.
FEEDING ECOLOGY AND DIET
They feed on insects, blue-green algae, and small crustaceans and fishes, which suggests that, like other members of this order, they are opportunistic species that goes after almost any food item. Vulnerable to dragonfly nymphs, larger fishes, water snakes, and fish-eating birds.

REPRODUCTIVE BIOLOGY
The major spawning period for pirate perch in the Achafalaya River Basin, Louisiana, is February through March. It appears that adult pirate perch are not territorial breeders but rather release their adhesive eggs over leaf litter and woody debris. They can live up to four years or longer.

CONSERVATION STATUS
Not listed by the IUCN.

SIGNIFICANCE TO HUMANS
This species is considered a water quality indicator species by the Arkansas Department of Environmental Quality for the Gulf Coastal Ecoregion.

**Troutperch**
*Percopsis omiscomaycus*

**FAMILY**
Percopidae

**TAXONOMY**
Salmo omiscomaycus Wallmann, 1792, Hudson Bay.

**OTHER COMMON NAMES**
English: Silver cisco; Finnish: Lohialven; French (Canada): Omisco.

**PHYSICAL CHARACTERISTICS**
Grows to 7.37 in (20 cm). Coloration can vary from yellowish to silvery to almost transparent, depending on the sexual state. There is a row of about 10 dark spots along the midline of the back and 10 or 11 spots along the lateral line, with another row of spots high on the sides and above the lateral line. The fins are always transparent. The most distinguishing characteristic is an adipose fin with small, weak spines on the dorsal and anal spines. Other characters include short Gill rakers and rough ctenoid scales. The lateral line is nearly straight.

**DISTRIBUTION**
The original distribution was the Atlantic and Arctic basins throughout most of Canada, from Quebec to the Yukon and British Columbia, and south to the Potomac River drainage in Virginia; the Yukon River drainage, the Yukon and Alaska; and the Great Lakes and Mississippi River basins south to West Virginia, eastern Kentucky, southern Illinois, central Missouri, North Dakota, and northern Montana. It has been introduced in the Houstonian River drainage of Connecticut and Massachusetts and into Willard Bay Reservoir and Utah Lake, Utah.

**HABITAT**
They occur in lakes, deep-flowing pools of creeks, and rivers and usually are found over sand.

**BEHAVIOR**
Individuals of this species move into the shallows of lakes at night to feed and then move back to deeper water as dawn approaches. Some populations spawn exclusively at night.
FEEDING ECOLOGY AND DIET
Feeds on smaller fish, benthic crustaceans, insects, and phytoplankton. Vulnerable to larger fish, water snakes, and fish-eating birds.

REPRODUCTIVE BIOLOGY
Spawning takes place between April and August. Two or more males compete for a single female by chasing her near the surface, often breaking the surface of the water. Eggs and milt are then released. Death has been recorded after spawning. They can live up to four years.

CONSERVATION STATUS
Not listed by the IUCN.

SIGNIFICANCE TO HUMANS
Occasionally used as bait.

Sand roller
Percaea transmontana

FAMILY
Percoidei

TAXONOMY
Colubraria transmontana Eigenmann and Eigenmann, 1892, near the mouth of the Umatilla River, Umatilla County, Oregon, United States.

OTHER COMMON NAMES
None known.

PHYSICAL CHARACTERISTICS
Grows to 3.78 in (9.6 cm). Like the troutperch, this species has a large and naked head and chambers in the lower jaws and checks known as "pearl organs."

DISTRIBUTION
This species is found in the Columbia River system and some tributaries from the middle Columbia River in Washington downstream to within 25 mi (40 km) above its mouth, including western Idaho, southern Washington, and northern and western Oregon, United States.

HABITAT
They occur in slow-moving portions of streams and rivers, such as backwaters and marginal pools. They prefer mud-sand bottoms, although they have been reported over rubble substrate with considerable aquatic vegetation.

BEHAVIOR
Nothing is known.

FEEDING ECOLOGY AND DIET
Feeds on small aquatic invertebrates. Vulnerable to dragonfly nymphs, larger fishes, water snakes, and fish-eating birds.

REPRODUCTIVE BIOLOGY
Little is known, except that they can live up to six years.

CONSERVATION STATUS
Not listed by the IUCN, but the species may have disappeared from Idaho waters.

SIGNIFICANCE TO HUMANS
They have no significant economic or cultural importance to humans.

Resources

Books


Periodicals


Resources


Other


Aldenaro Romero, Ph.D

Grzinic's Animal Life Encyclopedia