

Percopsiformes

(Troutperches and relatives)

Class Actinopterygii
Order Percopsiformes
Number of families 3

Photo: Troutperch (*Percopsis omiscomaycus*) combine the characteristics of spiny-rayed and soft-rayed fishes, resembling both trout and perch. (Photo by Animals Animals ©Raymond A. Mendez. Reproduced by permission.)



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 toadfishes (Batrachoidiformes). 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 Wilson proposed removal of the amblyopsid family from the group and created a new order: Amblyopsiformes.

There are two recognized suborders. The first, the Percopsoidei, 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 Aphredoderoidei, 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 cavernicoles (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 non-cavernicolous 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

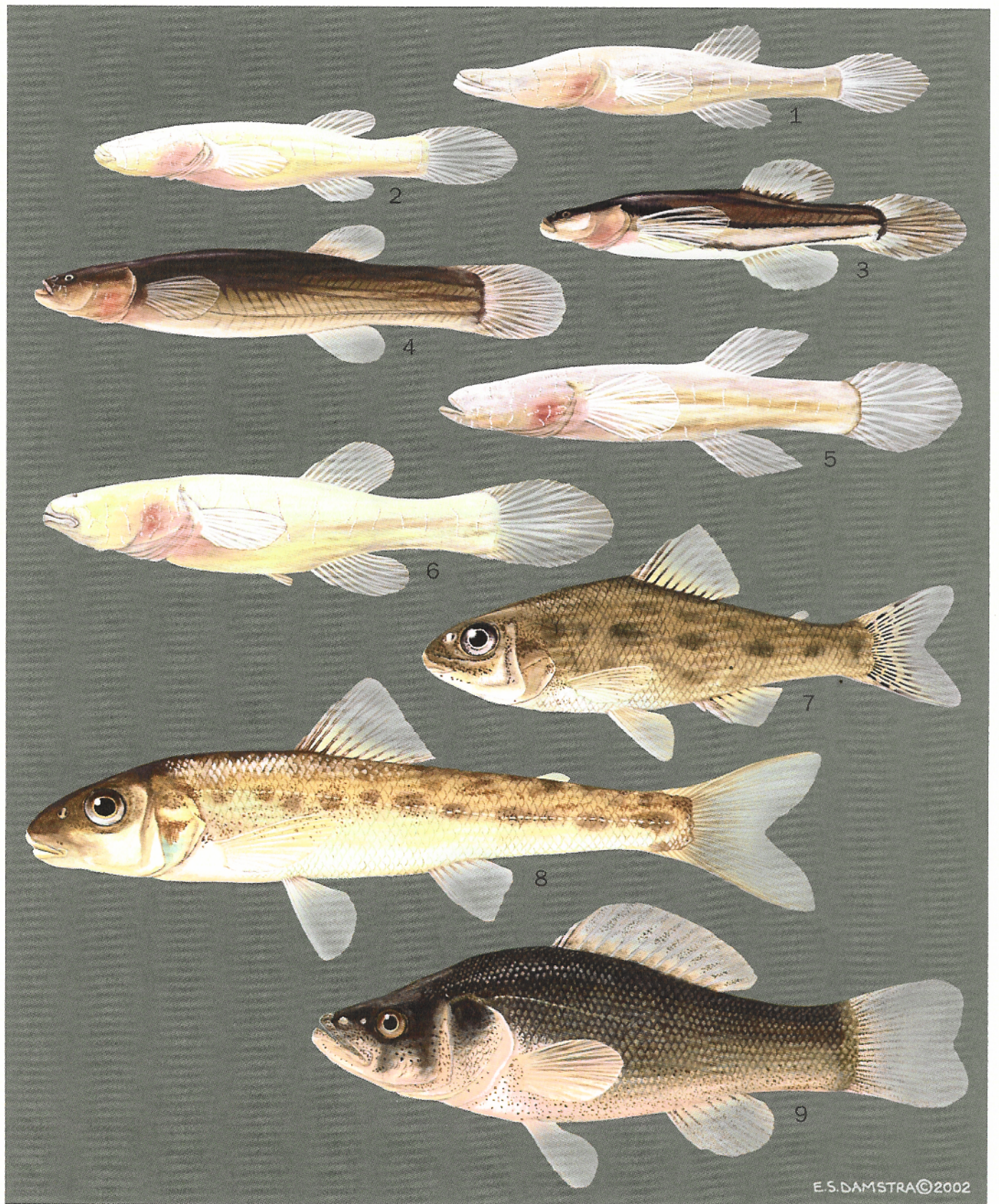
They are oviparous, but nothing else is known at the family level. Spawning (at least for the noncavernicolous species) takes place in the spring. Fecundity tends to be low.

Conservation status

The IUCN Red List includes four species from this order, all of which are cave-dwelling species from the family Amblyopsidae. *Speoplatyrhinus poulsoni* is listed as Critically Endangered, while *Amblyopsis rosae*, *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 (*Speoplatyrhinus poulsoni*); 2. Ozark cavefish (*Amblyopsis rosae*); 3. Swampfish (*Chologaster cornuta*); 4. Spring cavefish (*Forbesichthys agassizii*); 5. Southern cavefish (*Typhlichthys subterraneus*); 6. Northern cavefish (*Amblyopsis spelaea*); 7. Sand roller (*Percopsis transmontana*); 8. Troutperch (*Percopsis omiscomaycus*); 9. Pirate perch (*Aphredoderus sayanus*). (Illustration by Emily Damstra)

Species accounts

Ozark cavefish

Amblyopsis rosae

FAMILY
Amblyopsidae

TAXONOMY
Typhlichthys rosae 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 cave streams with a chert or rubble bottom, in pools over a silt and sand bottom, or in karst 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 70–90% of the contents by volume; the bal-

ance 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. ♦

Northern cavefish

Amblyopsis spelaea

FAMILY
Amblyopsidae

TAXONOMY
Amblyopsis spelaeus 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.

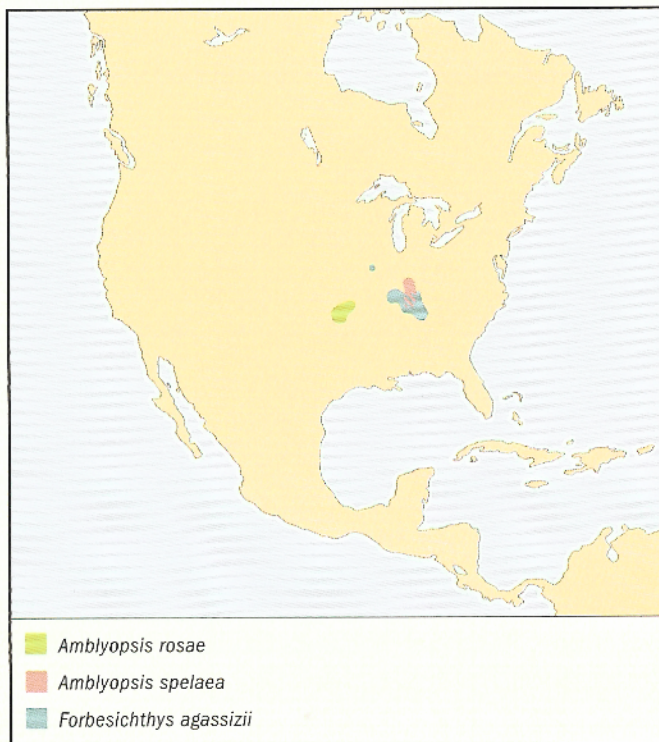
DISTRIBUTION
Individuals of this species are found in about 100 caves in Kentucky and southern Indiana. Based on field observations, Keith suggested that the species distribution may be limited by competition with the southern cavefish, *Typhlichthys subterraneus*.

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. ♦

Swampfish

Chologaster cornuta

FAMILY

Amblyopsidae

TAXONOMY

Chologaster cornutus Agassiz, 1853, "ditches of the rice fields in South Carolina."

OTHER COMMON NAMES

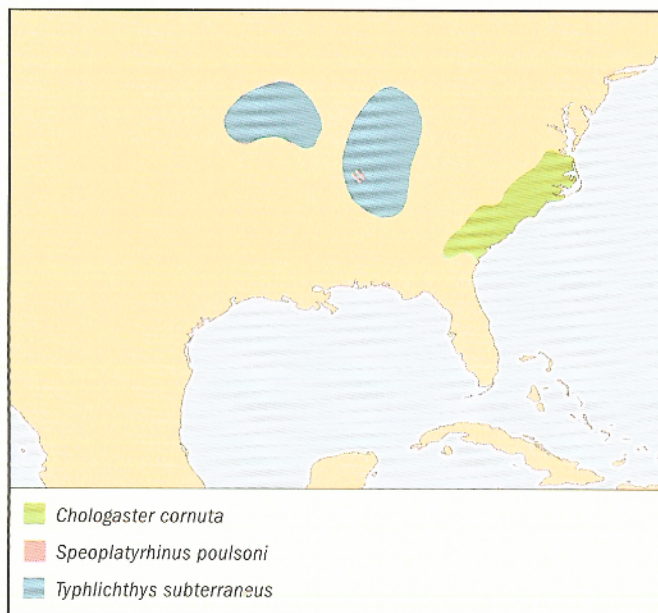
None known.

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 430 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. ♦

Spring cavefish

Forbesichthys agassizii

FAMILY

Amblyopsidae

TAXONOMY

This species originally was described under two names: *Chologaster agassizii* and *Forbesella agassizi* Putnam, 1872, a well in Lebanon, Wilson County, Tennessee, United States. The genus *Forbesichthys* was eventually adopted since *Forbesella* 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 triads 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 (rheotaxist) for periods of half a minute to one minute, but they typically show strong thigmotaxis and hide under rocks or debris. They prefer highly oxygenated over less oxygenated water but respond to light by moving away (scotophilia). 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. ♦

Alabama cavefish

Speoplatyrhinus poulsoni

FAMILY

Amblyopsidae

TAXONOMY

Speoplatyrhinus poulsoni Cooper and Kuehne, 1974, Key Cave, Alabama, United States.

OTHER COMMON NAMES

None known.

PHYSICAL CHARACTERISTICS

Grows to 2.83 in (7.2 cm). This species has an extremely elongated and anteriorly depressed head that makes up one-third of the standard length in adults. The snout is laterally compressed, with a terminal mouth. The species is white in coloration and lacks externally visible eyes as well as pelvic fins.

DISTRIBUTION

Its distribution is restricted to Key Cave, Lauderdale County, on the north bank of the Tennessee River.

HABITAT

They are found mostly in still waters of cave systems.

BEHAVIOR

Nothing is known about this very rarely studied species.

FEEDING ECOLOGY AND DIET

They feed on copepods, isopods, amphipods, and other small cavefish.

REPRODUCTIVE BIOLOGY

Little is known about the reproductive biology of this species, and what is known is not encouraging about its future potential for survival. It appears that only a small percentage of females reproduce, producing only a few eggs, and reproduction does not take place every year.

CONSERVATION STATUS

Its total population size is estimated to be less than 100 individuals, which would make it one of the most endangered fish

species in the world. It is classified as Critically Endangered by the IUCN and Endangered by the U.S. Fish and Wildlife Service. It is being threatened by groundwater pollution from agricultural runoff.

SIGNIFICANCE TO HUMANS

Of particular scientific value as a cave species. ♦

Southern cavefish

Typhlichthys subterraneus

FAMILY

Amblyopsidae

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 15 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

Feeds mainly 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

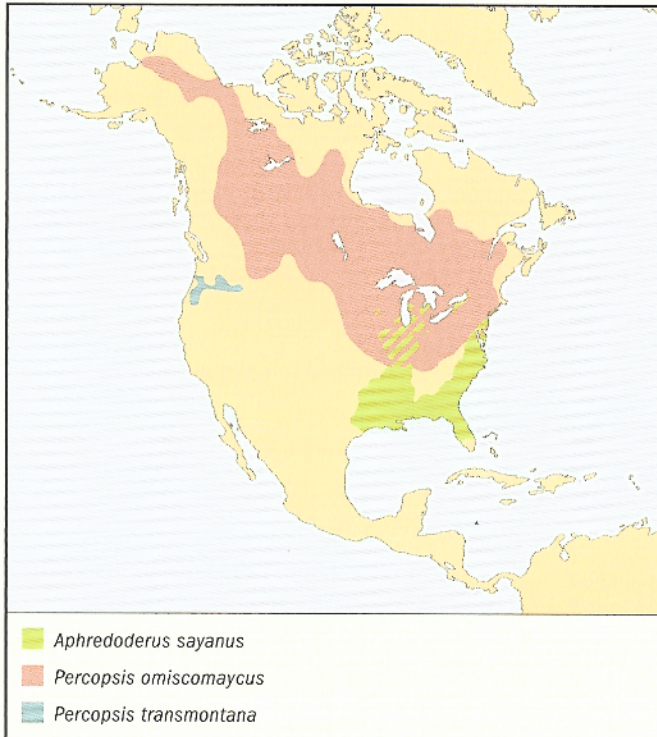
Aphredoderus sayanus

FAMILY

Aphredoderidae

TAXONOMY

Scolopsis sayanus (Gilliams, 1824), fishponds, Harrowgate, "near Philadelphia." Two subspecies have been proposed.

**OTHER COMMON NAMES**

German: Piratenbarsch.

PHYSICAL CHARACTERISTICS

Grows to 5.51 in (14.0 cm). A short, deep body, with a large head and mouth and a protruding jaw. They lack an adipose fin, and the lateral line is either absent or incomplete. The head is covered by ctenoid scales on the sides.

DISTRIBUTION

This species is found in waters of the Atlantic and Gulf slopes, the Mississippi Valley, and scattered parts of the eastern Great Lakes Basin in the United States from Minnesota south through the Mississippi Valley across the Gulf coast to Florida and north along the Atlantic coast to New York. It also can be found in the southeastern corner of Oklahoma, in the eastern-most tributaries of the Red River, and throughout the Coastal Plain of Arkansas (but not in the Ozark Mountains). There are isolated populations in the Lake Ontario and Lake Erie drainages in New York, and the species has been reported in Wisconsin outside what is considered their native range, which suggests introduction. Populations on the Atlantic slope have been considered a subspecies (*Aphredoderus sayanus sayanus*) distinct from the subpopulation of the Mississippi Valley (*A. s. gibbosus*). The populations from the Gulf of Mexico drainage have been termed intermediate.

HABITAT

They usually occur over mud in quiet bodies of water, such as swamps, vegetated sloughs, ponds, oxbow lakes, ditches, backwaters, and pools of creeks and in small to large rivers on mud and silt bottoms. Adults most frequently are found at sites whose bottoms are overlain with leaf litter. The larvae of this species can be quite abundant in some areas.

BEHAVIOR

This is a solitary and crepuscular species.

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 an 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 Atchafalaya River Basin, Louisiana, is February through March. It appears that adult pirate perch are not branchial brooders 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

Percopsidae

TAXONOMY

Salmo omiscomaycus Walbaum, 1792, Hudson Bay.

OTHER COMMON NAMES

English: Silver chub; Finnish: Lohiahven; French (Canada): Omisco.

PHYSICAL CHARACTERISTICS

Grows to 7.87 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 Housatonic 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 then are 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

Percopsis transmontana

FAMILY

Percopsidae

TAXONOMY

Columbia 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 cheeks 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. ♦

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