

Threatened fishes of the world: *Speoplatyrhinus poulsoni* Cooper & Kuehne, 1974 (Amblyopsidae)

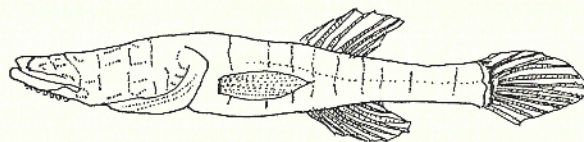
Aldemaro Romero

Department of Biology, University of Miami, P.O. Box 249118, Coral Gables, FL 33124, U.S.A.
(e-mail: aromero@umiami.ir.miami.edu)

Common name: Alabama cavefish (E).

Conservation status: Critically endangered (World Conservation Monitoring Centre); Endangered (U.S. Fish & Wildlife Service).

Identification: Another of the four species of troglotic (cave blind, depigmented) fishes of the family Amblyopsidae. It is small, on average 50 mm SL, and range between 31.2 and 58.3 mm. Body elongated head depressed and elongated. Head and branchial chamber are very large, comprising more than 33 percent of the SL. Lower jaw slightly projecting; tip of the snout rounded, dorsoventrally flattened, and laterally constricted, giving the anterior portion of the head a bill-like appearance. The nostrils have short, tubular and prominent projections; mouth nearly terminal. As in other amblyopsids, the vent is jugular in position and the body is covered by imbedded cycloid scales. Dorsal fin rather high. Anal and dorsal fins approximately same size, shape, and base length, but origin and insertion of anal slightly posterior. Pelvic fins absent. Pectoral fins long and delicate, pointed at tips. Caudal fin fairly deeply incised. The membranes of all fins are excised between the fin rays, imparting a spiked appearance. Bifurcate fin rays are absent from all fins. D 9–10, A 8–9, P 10 (9–11). 27–28 vertebrae. No externally visible eyes. The lateral-line system is greatly hypertrophied, with an extensive system of free neuromasts arranged in clearly visible ridges on the head and body. Sensory papillae on caudal fin are highly developed, larger and fewer than in any other amblyopsid with 9 and 10 and 14 and 15 rows. A row of papillae borders the posterior edge of the caudal peduncle. A row extends nearly the entire length of the medial borders of two fin rays in the superior half of the caudal fin and two rays in the inferior half. There are three nonpapilliferous fin rays between the medial-most rows of caudal sensory papillae, unlike *Typhlichthys subterraneus*, the only other cavefish known from Alabama, which has five rays between these rows. Body depigmented and relatively transparent with few and widely scattered nonfunctional melanophores on its fins, integument, and parts of its cranial skeleton. **Distribution:** It is apparently restricted to Key Cave, Lauderdale County, Alabama, in the north bank of the Tennessee River (Pickwick Reservoir). Despite extensive surveys in other area caves, the Alabama cavefish have not been found. This species' former distribution (if any) is unknown. **Abundance:** No population size estimate or population structure analysis have been performed. There are no data available on population dynamics or sex ratios. There are probably fewer than 100 individuals in Key Cave. No more than 10 cavefish have ever been observed on a single visit. **Habitat and ecology:** Key Cave is a large multi-level cave with over 3300 meters of mapped passages. It is mostly under cropland (cotton) and partly under a mixed deciduous wooded slope (strip along stream bank). The habitat is generally 'lacustrine' (lentic, phreatic groundwater) and consists of large carbonate conduits developed in thick-bedded limestones of Mississippian age. Key Cave lies between two minor, spring-fed tributaries that are seasonally active. A single major surface stream, Sinking Creek, resurges at Woodland Spring and enters the river some 3.2 km west of the cave. Water depths may rise to about 7 meters in late spring. The impact of these streams on the species' habitat is not known at this time. Aquatic substrates within the cave are variously bedrock and unconsolidated rubble/gravel/sand. There is minimal vadose seepage. Ground waters are highly insulated from surface conditions and display general constancy in a number of physicochemical factors (temperature: ca. 16° C, dissolved oxygen: 7–9.8 ppm, alkalinity: 169 ml l⁻¹ calcium carbonate, pH = 7.6, highly transparent waters). This cave lacks any visible incident radiation. Seasonal flooding is necessary to trigger hormonal changes within the cavefish for growth and reproduction. Gray bat, *Myotis grisecens*, guano contributes essential nourishment for all species involved in Key Cave's food chain. No dissections for analysis of digestive tract contents have been done. Thus, the specific prey items consumed by *S. poulsoni* have not been determined. **Reproduction:** Little information is available on its reproductive cycle. The largest specimen in collections is a 58.3 mm SL female, very conservatively estimated to be at least eight years old, containing what appear to be mature ova. The jugular position of the vent and the size of the branchial chamber, suggest the practice of branchial incubation. Of the small percentage of females which reproduce, only a few eggs are produced per female and reproduction does not occur in some years. **Threats:** The major single threat is groundwater contamination from agricultural operations within the recharge area of Key Cave. Most of Key Cave's recharge area is in row crops. The land immediately above and around that cave has numerous sink holes and water collecting depressions. The application of agrochemicals to these crops may impact the fauna of the cave. There is also a sludge disposal project within the recharge area for the



City of Florence, Alabama. Another primary threat is interference with the associated gray bat populations which indirectly contribute to the fish's food chain. Natural factors contributing to the vulnerability of this species are its small population size and low reproductive potential. Thus, collecting by amateurs or for scientific purposes poses a major threat for such a small population. Competition with the more numerous and aggressive Southern cavefish, *Typhlichthys subterraneus*, for food and space may also be a problem, which may explain why these two species are not known to coexist. Cave crayfish, a known predator of other cave fishes, are also abundant in Key Cave. Epigeal (surface eyed, pigmented) fish that are occasionally washed into the cave may also constitute a threat. The same may be true for racoons that occasionally visit the cave in search of cave crayfish. **Conservation action:** The Tennessee Valley Authority owns the two entrances to Key Cave, and has erected a fence to minimize human disturbance. Key Cave and nearby Bone Slough Cave have been mapped. This species was declared threatened by the U.S. Fish and Wildlife Service in 1977 and its status changed to endangered in 1988. This species is protected by the Lacey Act which makes it unlawful to import, export, transport, sell, receive, acquire, or purchase any wild animal (alive or dead including parts, products, eggs, or offspring). Since 1977 Key Cave has been designated as critical habitat. **Conservation recommendations:** Limit human access to protect extrinsic energy inputs (i.e. gray bat colonies). Collecting for scientific/educational purposes should be highly restricted and aimed only to recovery/conservation programs. Collecting for other purposes should be totally banned. There should be a program for land acquisition by purchase, conservation agreement or donation of important habitat areas in order to protect the drainage or recharge area for the aquifer. There should be a control on the agricultural practices in recharge area. Water table and quality should be carefully monitored and maintained. Additionally, there should be an aggressive research program that includes, but should not be limited to, research on the biology and distribution of the species as well as of Key Cave as ecosystem, local and regional hydrological patterns, field surveys of caves near Key Cave, and continuous monitoring of data on water quality. Recovery efforts also need to be implemented or continued to protect the endangered gray bat, an essential link in the cave's ecosystem. **Remarks:** First collected in 1967 the species was not described until seven years later. Only nine specimens have been collected, one of which is lost. This is one of the rarest and most endangered species of fish in the world!

Cooper, J.E. & R.A. Kuehne. 1974. *Speoplatyrhinus poulsoni*, a new genus and species of subterranean fish from Alabama. *Copeia* 1974: 486-493.

Department of the Interior. U.S. Fish and Wildlife Service, 28 September 1988. Endangered and Threatened Wildlife and Plants: Reclassification of the Alabama Cavefish from Threatened to Endangered. *Federal Register* 53: 188 (pp. 37968-37970 *Federal Register*, Vol. 42, No. 175, 9 September 1977).

U.S. Fish and Wildlife Service. 1985. Revised recovery plan for the Alabama cavefish, *Speoplatyrhinus poulsoni* Cooper & Kuehne 1974. Prepared by John E. Cooper, North Carolina Museum of Natural History, U.S. Fish and Wildlife Service, Atlanta. 66 pp.