

# The Sun

SERVING JONESBORO AND NORTHEAST ARKANSAS

Copyright © 2005 The Jonesboro Sun

## Blind cave fishes providing important clues to human blindness

**EDITOR'S NOTE:** Dr. Aldemaro Romero is chairman and professor of the Department of Biological Sciences at Arkansas State University. The following article is part of the *Jonesboro Sun's* periodical publication of articles of scientific interest to the community.

**BY ALDEMARO ROMERO**  
SPECIAL TO THE SUN

When scientists at the University of Maryland announced a few years ago that they had been able to recreate the eyes in a blind fish by implanting the lens from a normal-eyed fish during early stages of development, researchers were amazed and the implications were enormous. Did it mean that this technique could have applications for humans?

More than 100 species of blind cave fishes have now been discovered from all over the world (except Europe), and they are increasingly becoming the subject of research by many scientists. After all, naturally blind vertebrates are not that common, and the reason why they can survive without sight while living their entire lives in caves is, to put it mildly, astonishing.

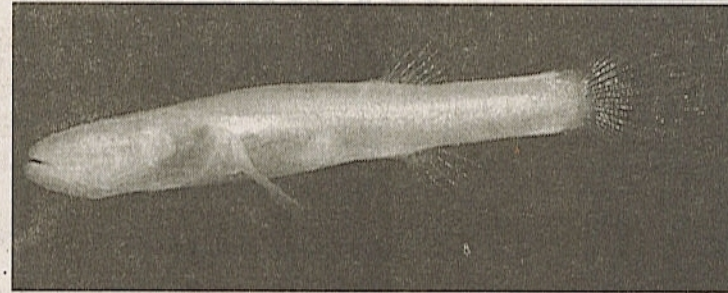
Two of these species are found in northern Arkansas: the southern cavefish and the Ozark cavefish. They rarely grow to be more than 2.5 inches in length, and besides being blind, they lack pigmentation.

While the southern cavefish prefers to live in deep water tables, greater than 600 feet in depth, the Ozark cavefish is usually found in small cave streams near larger perma-

nent streams.

There is usually very little food available in temperate caves. To conserve energy these creatures are slow swimmers and have very low metabolism. Both feed on whatever they can find: crustaceans, worms, insects. The Ozark cavefish, also eats bat guano, leaf litter, small salamanders, and young of their own species. In fact it is believed that members of this species rear their eggs in their gills to protect the young.

Populations of these cave fish species tend to be small, mostly fewer than 150 individuals. Because underground waters are being impacted by pollution, almost all cave fish species of the world are considered threatened to one degree or another. In fact, the Alabama cavefish, a close rela-



Danté Fenolio

**The southern cavefish.**

tive of those found in Arkansas, is believed to be represented by fewer than 100 individuals, which makes it the most endangered fish in the world.

Most of the research that is being done these days on cave fishes is the study of their lack of eyes. When the researchers at Maryland were able to regenerate the eyes in one of the

species, the Mexican blind cave tetra, the next question was, "but can they see?" Researchers at Arkansas State University found that was not the case: although the fish had regenerated their eyes, they did not respond to light stimuli.

However, these same researchers have found that when Mexican cave tetras are kept under extremely bright

light conditions during the early stages of development, they are able to regenerate some eye tissue and pigmentation. In fact, regeneration of pigmentation has also been reported for the southern cave fish.

Now scientists at ASU are initiating a research program to look at the genetic basis of such environmental responses. Given that the genes that control eye development are essentially the same for all vertebrates, from fishes to humans, maybe we can learn more about the developmental mechanisms that result in blindness in humans at birth. Hopefully, we can learn what it takes to see the light.

**On the Net:**

Department of Biological Sciences at Arkansas State Information biology.astate.edu.