

Texas A&M scientists study Mexican fish with an ‘alien’ appetite

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COLLEGE STATION – Could there be life on other planets less hospitable than ours? Many have speculated the possibility, but a team of Texas A&M University and Oklahoma State University scientists studying a tiny Mexican fish think it’s plausible.



“The fish we study are extremophiles, meaning they are adapted to life at the edge of biological tolerance,” said Katherine Roach, a graduate student at Texas A&M University in the wildlife and fisheries sciences department.

Roach, together with Regent’s Professor Dr. Kirk Winemiller and collaborator Michael Tobler, recently authored a paper on the fish accepted for future publication in the journal Ecology. The small fish their study focuses on is *Poecilia mexicana* found in the Cueva del Azufre or the “cave of sulfur” located in Tabasco state, Mexico.



The small (about 2.5 inches at maturity), almost blind fish live in total darkness swimming in oxygen-starved water with hydrogen sulfide concentrations so toxic they would kill most other life forms, according to Roach.

“Our research shows that organic carbon produced by sulfur bacteria oxidizing dissolved hydrogen sulfide, a process called chemoautotrophy, is the main food source for the fish,” Roach said. “Though it is known that simpler life forms flourish by feeding through this process, ours is the first study to actually document a fish, a true vertebrate, directly receiving its sustenance through bacteria performing chemoautotrophy.

“Their ecosystem in the cave is basically self-sustaining without much input from plants at the surface. As a result, our research has implications for discovering life outside the earth. If these complex vertebrates can thrive on sulfur bacteria, why couldn’t similar, more evolutionary derived organisms be supported by chemoautotrophic bacteria on other moons or planets such as Europa, one of Jupiter’s moons? It may not be altogether impossible.”

Roach explained that most of the earth’s ecosystems have food chains supported by organic carbon produced from the fixation of atmospheric carbon dioxide by plants using sunlight. These, in turn, release breathable oxygen into the atmosphere.

Roach said another study in Movile Cave in Romania a few years ago examined a population of macroinvertebrates that have been isolated in the cave for some 5.5 million years, which also feed on chemoautotrophic bacteria. She said that study generated enough public interest to warrant its own Wikipedia page http://en.wikipedia.org/wiki/Movile_Cave and noted that author E.O. Wilson highlights this case study in his book *The Future of Life*.

“What makes our study so exciting is that we’re the first to actually document a fish, a relatively large and complex vertebrate, that is able to thrive by being solely supported by chemoautotrophic-processed hydrogen sulfide bacteria,” Roach said.

Once their study is published in about two months, Roach said their work can be found at http://www.wfsc.tamu.edu/winemiller/lab/Roach_publications.htm.

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