



## RESEARCHERS AIM TO BOOST PRODUCTION OF TWO NATIVE FISH SPECIES IN MEXICO

By Tiffany Woods

Rafael Fernandez Guzman raises tilapia out in the lush, green Mexican countryside. It's a place where cows graze and the roads are lined with stands selling tortillas, papayas, potted plants, bananas and roasted chickens.

The straw hat-wearing, cell phone-carrying former cattle rancher farms the fish in rectangular, excavated earthen ponds roughly the size of basketball courts not far from the city of Villahermosa. His customers drive up and buy them fresh from the water, still breathing and flopping. He sold 120 metric tons of tilapia in 2009, the equivalent of 230,000 fish, he says.

Now he wants to branch into popular native species like Mayan cichlids and bay snooks (they're not actually related to snooks) because customers regularly ask for them, he says. The problem is, though, that he's not sure if these fish would be as lucrative as tilapia. He wouldn't

*Photo Above: Enrique Hernandez Gonzalez inspects a mesh cage of Mayan cichlids. A student at the Autonomous Juarez University of Tabasco in Villahermosa, Mexico, he is helping conduct research that aims to develop a genetically superior broodstock of Mayan cichlids and bay snooks for use in fish farming. Photo By Tiffany Woods*

stray from tilapia, he says, unless he could earn a profit margin of at least 25 percent.

Researchers at the Autonomous Juarez University of Tabasco in Villahermosa are trying to make sure that he can. Through systematic breeding, they're working to develop improved broodstocks of Mayan cichlids and bay snooks that would produce fast-growing, meaty fish that are consistent in size and quality and could compete economically with tilapia when raised in farmed conditions. The university aims to sell the juveniles, known as fingerlings, to fish farmers in southeastern Mexico.

Production of these species in captivity is also necessary because environmental degradation and overfishing have reduced their populations, says Kevin Fitzsimmons, a professor at the University of Arizona and a former president of the World Aquaculture Society.

He's one of the participants in the project, which is partially funded by the U.S. Agency for International Development through its AquaFish Collaborative Research Support Program headquartered at Oregon State University. Hillary Egna, the program's director, initiated the project.

For nearly a decade, the university in Villahermosa has been breeding and raising these native cichlids in captivity and selling them to the state of Tabasco and local governments for repopulation efforts, but this is its first attempt to improve the genetics of farmed stocks, says Wilfrido Contreras Sanchez, the lead Mexican researcher on the project.

The omnivorous Mayan cichlid, known locally as castarrica, is native to the fresh and brackish waters of Central America and southeastern Mexico. It has black vertical bands on its sides and is just the right size to fit on a dinner plate. The carnivorous bay snook, also known as tenguayaca or giant cichlid, has a line of large black spots on its sides, inhabits fresh waters in southeastern Mexico and Central America and grows slightly bigger than the Mayan cichlid.

Researchers chose these two species because they have been overexploited, they fetch higher prices than tilapia in local markets,

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consumers like them, and fish farmers want to raise native species because of their popularity, Contreras says.

The challenge, however, is to produce fish that grow fast enough to compete with the quick-growing tilapia, a popular, easy-to-raise, non-native farmed cichlid that is ready for market after six months in grow-out ponds. The reason for wanting to speed up their growth is simple: The longer fish take to reach market sizes, the more money producers have to spend on feeding them.

Contreras doubts that these native species could ever grow as fast as tilapia. But, he says, if the time were shortened even just partially, the economics might work out in the end because of their more lucrative price. At local fish markets, one kilogram (2.2 pounds) of tilapia sells for around 40 pesos (about \$3.40) but bay snooks and Mayan cichlids command at least twice that.

Libido Rivera Lopez knows about the economics. The wiry, soft-spoken fish farmer and other members of a cooperative in the community of Cucuyulapa took a stab at raising Mayan cichlids but threw in the towel because the fish took too long to reach a marketable size. They went back to their trusty tilapia.

But if the researchers' work is successful, Rivera might have a second chance. At one of the university's campuses near Villahermosa, the project is in full swing. Dozens of mesh cages holding Mayan cichlids and bay snooks float

in two earthen ponds. The fish are the offspring of nearly 200 wild progenitors that underwent a rigorous physical exam, including blood cell counts, before being deemed healthy enough to be parent material. Once the blood work was done, the fish consummated their relationships in nuptial tanks and spawned hundreds of thousands of small fry.

Researchers have been gradually weeding out the slow-growing offspring. It's tedious, repetitive, slimy, sweaty, wet work. The kind you give to students – like Enrique Hernandez Gonzalez. The biology undergraduate is up

to his waist in the pond water, dragging the cages to shore and scooping Mayan cichlids into a bucket. Standing in the sweltering humidity under a tree, graduate student Beatriz Adriana Hernandez Vera then weighs and measures their flopping, slippery bodies as Rosa Aurora Perez Perez, also a graduate student, records the data on a clipboard. Thousands of squirming fish have passed through their hands since the selection process started in 2009.

They'll keep an elite group of the largest and heaviest ones. They'll then breed those lucky few, cull their undersized offspring, breed the survivors, discard the lightweights and voilà, several crosses later, they'll have the final crème de la

crème parent stock: 880 hearty Mayan cichlids and 960 robust bay snooks, with both groups equally split by gender. They'll be maintained as broodstock to supply a steady stream of fingerlings to fish farmers.

One day, those offspring just might end up at Rafael Fernandez's fish farm.



*Fishmonger Candelario Jimenez Hernandez holds up a small Mayan cichlid at a market in Villahermosa, Mexico. He also sells tilapia (in foreground) and bay snooks (the yellowish, spotted fish in center). Photo By Tiffany Woods*

For more on how researchers in Mexico are trying to develop a genetically superior broodstock of Mayan cichlids and bay snooks for use in fish farming in a video produced by Tiffany Woods, please visit the AquaFish CRSP website: [aquafishcrsp.oregonstate.edu/news\\_events.php](http://aquafishcrsp.oregonstate.edu/news_events.php)

