

# Raising Fish in the Desert

*Aquaculture yields fish and shrimp*

*by Joanne Littlefield*

**A**midst the bustle of Tucson airport traffic and new construction, the greenhouses at the adjacent Environmental Research Lab (ERL) are lined with tanks of fish. University of Arizona scientists are examining tilapia, trout, koi, catfish and shrimp; their diseases, nutritional needs, life cycles and peak harvest size. World-wide, aquaculture is considered the fastest growing agricultural industry: 20 to 25 percent of the world's seafood is now grown in confined operations.

College of Agriculture and Life Sciences (CALS) research scientist Kevin Fitzsimmons says interest from Mexico led to the initiation of the Tucson-based research years ago. "Because of increasing pollution of coastal waters, agricultural producers in Mexico were looking for ways to grow fish inland using desalinated water and they turned to the University of Arizona for answers."

Although they continue to aid Mexican agricultural producers, UA researchers have also spent the last ten years investigating how to integrate aquaculture into irrigated agriculture, in response to social, economic and political pressure in Arizona. They are conducting experiments at the ERL and at the UA's Maricopa Agricultural Center in central Arizona.

By 1999, state aquaculture operations produced approximately 1,449,000 pounds of whole fish and shrimp. But while fish production has been relatively slow, with an estimated \$2,400,000 in sales, shrimp production has been the one steadily increasing sector. Three farms in the Gila Bend-Hyder area produced 217,000 pounds of freshwater shrimp that year, according to Fitzsimmons.

"Production of the pacific white shrimp, *Peneaus vannamei*, in the slightly brackish geothermal water in southwestern Arizona may prove to be one of the best uses of that water," he says. Other parts of the state, too, are experiencing increased benefits from having aquaculture in a produc-

Aquaculture can be profitable for Arizona growers. Scientists are growing fish in tanks at the Environmental Research Lab to help develop more techniques for adopting this technology into cropping plans and educational programs.



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UA graduate student Jake Dillard, a graduate from Chino Valley High School, which had the first high school aquaculture unit, stands next to a fish tank at the ERL with research scientist Kevin Fitzsimmons. Dillard is now completing his education at UA where he has updated aquaculture units for high schools to recycle nutrient-rich water to plants.

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tion plan, including multiple uses from the same water.

The use of triploid grass carp for weed control in Salt River Project canals in the Phoenix and Yuma area was also investigated at ERL. In underwater exploration prior to releasing the carp, Fitzsimmons says they found it resembled a kelp forest. Instead of applying mechanical or chemical weed control to clean clogged screens on these waters, the fish became aquatic lawnmowers. Now, Fitzsimmons says "The canals are as clean as a swimming pool."

One of the big successes of this research, according to Fitzsimmons, may be the aquaculture education programs at 15 Arizona high schools. "Teachers are creating joint educational programs where they can teach everything, including chemistry, physics, shop and even cooking."

Fitzsimmons adds that you can teach most of the same subject material with fish that you can with a large animal, without many of the associated problems, such as offensive odors and large space requirements.

"You can teach animal reproduction, nutrition and marketing with a fish instead of a large stock animal."

Although test marketing of tilapia to consumers and chefs continues, and the shrimp from Gila Bend are already a hit, growers in Arizona are finding additional markets for the fish they raise. These include urban fishing businesses, and golf courses with biological control programs for weeds and insects, such as mosquitoes and midge flies. ♦