

## HSWRI Aquaculture Program Research Report \*\*\* February & March 2011 \*\*\*



### International Collaboration on Yellowfin Tuna Culture Yields Promising Initial Results

Researchers at Hubbs-SeaWorld Research Institute (HSWRI) and the Inter-American Tropical Tuna Commission (IATTC) recently completed the first successful air shipments of yellowfin tuna eggs and larvae into the United States. The parental stock of tuna resides at the IATTC's research laboratory in Achotines, Panama, where adult tuna have been spawning in captivity since 1996. HSWRI Research Scientist Kevin Stuart recently spent a week working with IATTC scientists at Achotines, observing spawning activity and culture techniques. The cultured eggs and larvae are being used in a joint effort to advance hatchery technologies for this very popular food fish.



**Figure 1.** IATTC and HSWRI scientists in Panama, prepare to ship yellowfin tuna eggs and larvae to San Diego.

Thus far in the project, the research teams have conducted shipping simulations using eggs and larvae of yellowfin tuna in Achotines and California yellowtail in San Diego (Figure 1). These trials were used to determine appropriate shipping methods that yield good survival. This has led to several air shipments of yellowfin tuna eggs and larvae, which required a significant amount of logistical coordination on both ends. The most recent shipment took 24 hours to complete and yielded survival rates following shipment as high as 90%. Subsequent larval rearing success at HSWRI has improved incrementally with each shipment as researchers make refinements to meet the needs of these delicate larvae (Figure 2). The success of this effort is significant as world-wide there are very few captive breeding populations of tuna. The ability to ship eggs and larvae over great distances will open a host of opportunities to work with these delicate, high-performance fish.



**Figure 2.** A yellowfin tuna larva in culture at HSWRI at nine days post hatch.

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## HSWRI Scientists Make Showing at AQUACULTURE 2011

AQUACULTURE America 2011 took place in New Orleans, LA, from February 28<sup>th</sup> through March 3<sup>rd</sup>. Institute attendees included Don Kent, Mark Drawbridge, Dave Jirsa, Kevin Stuart, Federico Rotman, and Chris Peters and associated University of San Diego (USD) graduate student Daniel Wroblewski. Kevin Stuart and Federico Rotman attended a conference-sponsored tour to the University of Southern Mississippi Thad Cochran Center for Marine Aquaculture (TCCMA) in Ocean Springs, MS, and Aqua Green, LLC, in Perkinston, MS.



**Figure 3.** USD graduate student and Sea Grant Trainee, Daniel Wroblewski, presents his thesis research at the World Aquaculture Society meeting.

The concurrent sessions at AQUACULTURE 2011 contained the most recent research and information on innovative aquaculture practices, with topics ranging from “Policy and Regulations” to “Emerging Species and Technologies.” HSWRI researchers contributed to these discussions and presented results from a wide range of experiments completed over the past year. Chris Peters and Kevin Stuart gave presentations entitled “Optimization of Live Feeds Strategies for California Yellowtail *Seriola lalandi*” and “Green Water Alternatives for Culture in California Yellowtail *Seriola lalandi*,”

respectively, in the “Marine Finfish Hatchery and Larval Production” session. Dave Jirsa presented “Effects of Supplemental Taurine in Soy-Based diets for White Seabass *Atractoscion nobilis* and California Yellowtail *Seriola lalandi*” in “Marine Fish Nutrition.” Finally, Daniel Wroblewski from USD presented in the “Alternative Feed Ingredients” session, reporting on the “Effect of Dietary Inclusion of Spirulina *Arthrospira platensis* on the Growth, Body Composition, and Hematology of Juvenile White Seabass *Atractoscion nobilis* and California Yellowtail *Seriola lalandi*.”

## HSWRI Partners with Get Inspired!, Inc To Launch Seabass In the Classroom Program

In a three way partnership, HSWRI is working with non-profit organization Get Inspired!, Inc and Huntington Beach High School (HBHS) students to grow white seabass in their classroom as part of the science curriculum. Three different classes (AP Environmental Science, Biology, and Life Science) totaling approximately 180 students are involved in the project. The students are taught by HBHS science teacher Greg Gardiner and Get Inspired!, Inc founder and marine biologist Nancy Caruso. As part of the program, the students learned about kelp forest ecology, ichthyology, the history of the white seabass program, as well as topics in aquaculture. The centerpiece of the program is a 1,400L recirculating culture pool that was constructed by the team last fall and is currently holding 63 juvenile seabass. The system is located in a storage room

adjacent to the classroom so students can check in on the fish regularly during the day. Students are doing everything from making seawater to cleaning the protein skimmer and feeding the animals. Greg Gardiner uses the culture system to teach science lessons and he schedules the students to test water chemistry and perform routine feeding, cleaning and water changes. Recently, the school's statistics teacher used the tank in a project with her students. The white seabass project makes science "real" and offers a "hands-on" laboratory activity for students to engage in. It reinforces the idea that America's youth can make a difference in our environmental world. In upcoming weeks the HBHS fish will be tagged and given a health inspection before being released in to coastal waters in June. Development of the next "Seabass in the Classroom" project is currently underway at La Jolla High School in La Jolla, California.



**Figure 4.** A student from HBHS performs maintenance on their new recirculating system for WSB.

## Acknowledgements

This document reports on Aquaculture Research Projects supported by numerous grants, contracts and private contributions. It also represents the hard work of many dedicated staff and volunteers throughout southern California. This information was contributed by HSWRI staff and compiled by Aquaculture and Fisheries Research Coordinator Dr. Kristen Gruenthal under the direction of Senior Research Scientist and Aquaculture Program Manager Mark Drawbridge.

The Aquaculture Research Program has been active for more than 30 years at HSWRI. The primary objective of this program is to evaluate the feasibility of culturing marine organisms to replenish ocean resources through stocking, and to supply consumers with a direct source of high quality seafood through aquatic farming. Please direct any questions to Dr. Kristen Gruenthal at [kgruenthal@hswri.org](mailto:kgruenthal@hswri.org).

Aquaculture research at HSWRI is currently supported by these major contributors:

- Cabrillo Power/NRG
- California Sea Grant
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- Darden Restaurants Foundation
- Indian River Lagoon National Estuary Program
- National Institute of Food and Agriculture



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- NOAA Fisheries
  - NOAA's Saltonstall-Kennedy Program
  - San Diego County Fish and Wildlife Advisory Commission
  - SeaWorld Parks and Entertainment
  - SeaWorld San Diego
  - The California Department of Fish and Game's Ocean Resources Enhancement and Hatchery Program
  - The Catalina Seabass Fund
  - The Fletcher Foundation
  - The Shedd Family
  - The U.S. Fish and Wildlife Service's Sport Fish Restoration Account
  - United Soybean Board

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