

*Regional
e-Notes*

Letter from the Director

Aloha & Happy New Year!

2011 is shaping up to be a great year for CTSA. In addition to managing projects funded by the Center, our administrative staff is working hard to develop initiatives and publications that are relevant to our stakeholders.

Starting next month, each issue of e-Notes will feature a "Farmer Spotlight" that will introduce different aquaculture farmers throughout the CTSA region. In addition, our monthly "Pacific Island Spotlight" will now feature a series of short stories about aquaculture in the Western Pacific by CTSA's Information Specialist Meredith Brooks, who recently traveled to the CNMI and Micronesia.

As always, if you have any suggestions, concerns, or comments, please do not hesitate to let us know. We look forward to seeing you again in the new year!

Mahalo,

Cheng-Sheng Lee
Executive Director, CTSA

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What Should CTSA's Funding Priorities be for 2011? Comment Now!

In preparation for CTSA's FY2011 Development Process, we are requesting stakeholder input on potential research priorities. Per the USDA, future CTSA research should place a greater emphasis on outcomes, and focus on bridging the gap from "Science to Practice". Therefore, we are striving to fund projects that make measurable impacts to the industry and community, and need your help in identifying the areas that need the most support.

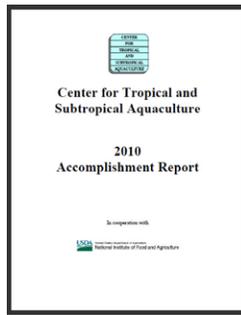
Please consider the following questions:

- 1) What do you need from CTSA to make your industry more profitable?
- 2) What challenges is your industry facing?
- 3) What are your desired outputs?

Please send any comments or suggestions to Meredith Brooks at mbrooks@oceanicinstitute.org by February 11.

CTSA Annual Accomplishment Report Summary

As 2011 begins, we would like to take time to assess achievements from 2010 and highlight research reported in our recently published [Annual Accomplishment Report](#).



Since its inception in 1986, CTSA has funded 222 research, demonstration, development, and extension projects. Of the 22 projects active in 2010, nine reached completion, including the "Harlequin Shrimp" project (P.I. Shaun Moss, Ph.D); the "Guam Aquaculture Development Plan" project (P.I. John Brown, Ph.D); the "Black Pearl" project (P.I. Masahiro Ito, Ph.D); the "Kahala Broodstock" project (P.I. Charles Laidley, Ph.D.); the "Shrimp demonstration in CNMI and Guam" project (P.I. Dustin Moss); and the "Swordtails" project (P.I. Clyde Tamaru, Ph.D). The other three completed projects are summarized below.

The goal of the completed project "Development of DNA Markers for Pacific Threadfin Aquaculture, Years 1 and 2" was to develop the first generation of DNA microsatellite markers of Pacific threadfin, then to employ them to compare the genetic diversity of captive broodstock populations to the natural populations for a sustainable Pacific threadfin aquaculture development in Hawaii. Under the direction of Jinzeng Yang, Ph.D., at the University of Hawaii, and Charles Laidley, Ph.D., at the Oceanic Institute, the research group successfully developed 52 microsatellite loci and PCR protocols for optimal amplification of the markers. In addition, a microsatellite DNA-based method of parental assignment was developed. Based on results from a second round of parentage analysis using eight microsatellite markers, 98% of offspring were assigned to their parents.

The "Sea Cucumber Hatchery Production Technology Transfer in Pohnpei, Federated States of Micronesia, Years 1 and 2" project, led by Masahiro Ito, Ph.D., was designed to address the "boom and bust" pattern of the current sea cucumber industry by introducing hatchery production of sea cucumber: from spawning and larval rearing to grow-out. Under the auspices of the project, larval development and larval rearing protocols were developed. A total of 24 spawning induction trials and 12 larval runs were conducted during the project and resulted in several hundred juveniles, which are awaiting the next phase of work on marking and/or tagging experiments for a restocking project. In addition, this project developed a semi-closed system with a false-bottom tank for long term holding work. This system simulates the natural habitat of the sandfish with seagrass (eel grass) and seaweed (i.e. Caulerpa, Gracilaria, Sargassum and other species) on the top layer, supplying naturally occurring food.

"Promoting Health Management of Shrimp Aquaculture on Guam and the Commonwealth of Northern Mariana Islands (CNMI)" was a project led by Hui Gong, Ph.D. in an effort to determine the current state of biosecurity practices on existing shrimp farms in the region; evaluate the health condition of shrimp stock through diagnostics; and provide farm-specific recommendations on health management. Biosecurity audits of seven shrimp farms in Guam and the CNMI were conducted. A site-specific executive report was generated for each facility but, in general, audits found that the greatest risk for some facilities is the seed sources imported from the Asian countries, and that there is possible presence of IHNV in a couple of locations. A comprehensive report evaluating the current health status of shrimp aquaculture in the Mariana Islands region, identifying the key biosecurity risk factor, and prioritizing the issues for improving industry-wide biosecurity measures in the region was generated and distributed regionally.

In addition, five new projects were awarded funding in 2010:

- 1) "Aquaculture of Opihi" - led by Warren Dominy, Ph.D.
- 2) "Developing a value-added product "half-pearls" from the blacklip pearl oyster *Pinctada margaritifera* in Pohnpei, FSM" - led by Masahiro Ito, Ph.D.
- 3) "DNA-Based Identification and Selection of High-growth tilapia in Hawaii" - led by Jinzeng Yang, Ph.D.
- 4) "Collection and Health Certification of Coral grouper broodstock in the Mariana Islands" - led by Hui Gong, Ph.D.
- 5) "Adapting Aquaponics Systems for Use in the Pacific Islands" - led by Kent Kobayashi, Ph.D.
- 6) "PRAISE & Publications, Year 5" - led by Kris Anderson

For more details on 2010 achievements, please click here to read the [2010 Annual Accomplishment](#)

[Report](#), available on the CTSA website.

Upcoming CTAHR Water Quality Workshop

On Saturday, March 12, the College of Tropical Agriculture and Human Resources (CTAHR) Aquaculture Extension program will hold a workshop on Basic Water Quality Testing for Aquaponic Systems. The workshop, which is a part of the CTSA project "Diversifying Freshwater Aquaculture Products for Hawaii: Two Crossover Species, the Red and Black Pacu," will be held at Windward Community College (Hale Imiloa 123) from 9am - 12pm. The cost is \$30 per person.

After completing this workshop, a participant will...

- Know what total nitrate-nitrogen is and how and why it is measured.
- Have a basic understanding of the nitrogen cycle in an aquatic setting.
- Know what water chemistry parameters are important to measure.
- Know what pH is and why and how it is measured.
- Have an understanding of how to make an informed decision as to what method to use/purchase to measure the water chemistry parameters.

In addition to the workshop activities, participants are encouraged to bring their own water sample and have it tested using the various methods that will be available at the workshop. Participants can also bring their own test kits if they already are using them to compare against other kits and methods that will be available at the workshop.

The workshop is limited to 20 participants because of the size of the classroom. Pre-registration is on a first come first serve basis and pre-payment will be required to participate in the workshop. Additional workshops following the same format will be held depending on demand.

To make a reservation please contact: RuthEllen Klinger-Bowen rckb@hawaii.edu or Clyde Tamaru ctamaru@hawaii.edu.

Payment is by check, money order or cash only. Make checks or money order payable to RCUH and send payment to: Department of Molecular Biosciences and Bioengineering, University of Hawaii-Manoa, 1955 East-West Road, Ag. Science 218, Honolulu, HI 96822.

Pacific Island Spotlight: Aquaculture in the CNMI & FSM

By Meredith Brooks

In December, I had the incredible opportunity to travel on behalf of CTSA to Saipan and Rota, Commonwealth of the Northern Mariana Islands, and Pohnpei, Federated States of Micronesia. While there, I conducted several interviews with farmers, aquaculture technicians, researchers, marine resource managers, educators, and local fishermen to obtain some general opinions on the aquaculture industry and sustainability in the Western Pacific. Each interview was a discussion about a wide-range of topics that ignited passion, frustration, and desire in the interviewee. Among the topics most notably discussed were the rewards and challenges of expanding the local aquaculture industry, local wild fishery productivity, and food security for islands that currently import a majority of their consumable goods, just to name a few!



Nett Point Oyster Farm, Pohnpei

Over the next year, I will use this "Pacific Island Spotlight" column to introduce you to a variety of critical players and topics pertaining to aquaculture expansion in the region. It is my hope that I can adequately express the concerns and hopes of the hard-working men and women I met who all share the desire for food and economic security; not only for their families, but also for the future of

their islands.

As an introduction to this year-long column, I will briefly explain the main purposes of my trip. I first traveled to the CNMI to implement CTSA's new aquaculture education program. Under a NOAA education grant, CTSA is producing a constructivist-approach based program and curriculum that engages students in science by encouraging them to ask questions and seek their own answers through experimentation and research. While on the island of Rota, I conducted a presentation about sustainability and food security in education at the High School, and worked with the students to begin setting up the aquaponics system they will use in conjunction with our curriculum. We are excited to implement the pilot year of this program in both Rota and Waiialua, Hawaii.

I then traveled to Pohnpei to meet with Dr. Masahiro Ito and the talented team of local technicians behind the CTSA "Black Pearl" and "Sandfish" projects in the FSM. Both of these successful projects have laid the foundation for a promising aquaculture industry in Pohnpei. However, there are still hurdles that Masahiro and his team must overcome to expand local operations. Stay tuned to learn about the Micronesian technicians, the aquaculture education project, and much more!

AquaClip: Can Oysters Be Used to Clean up the Environment?

Taken from e!sciencenews.com. Friday, January 21, 2011

Chronic water quality problems caused by agricultural and urban runoff, municipal wastewater, and atmospheric deposition from the burning of fossil fuels leads to oxygen depletion, loss of biodiversity, and harmful algal blooms. This nutrient pollution is prevalent in many coastal marine and estuarine ecosystems worldwide. Chesapeake Bay is the largest estuary in North America and although many efforts have been taken to improve its water quality, nutrient pollution still keeps it at unacceptable levels. In a study funded by the U.S. Environmental Protection Administration and administered by the National Fish and Wildlife Foundation, biologists at Virginia Commonwealth University measured the nutrient removal capacity of the Eastern oyster, *Crassostrea virginica*.

Researchers found that an additional 2.5 cm of growth allowed a farmed oyster to remove 2.2 times the nutrients of a regular oyster. In fact, a large scale oyster farm harvesting 1 million of these 76 mm oysters can remove 132 kg of nitrogen, 19 kg of phosphorus, and 3,823 kg of carbon. The full study is available in the January/February 2011 issue of the *Journal of Environmental Quality*.

Oysters were a novel yet obvious choice to enhance the ecosystem's water quality. They process nutrients while feeding on phytoplankton and then store the nutrients in their shells and tissue through a process known as bioassimilation. Although Chesapeake Bay is a natural habitat for the Eastern oyster, 99% of the native population has been lost. This prompted researchers to explore the use of commercial oyster farms.

Oysters were raised at two commercial-scale aquaculture sites in Chesapeake Bay as well as a site in Maryland and one in Virginia to represent two typical cultivation environments in the Bay. The nutrient contents of the tissues and shells of oysters of various sizes were measured.

According to Colleen Higgins of Virginia Commonwealth University, "Based on these results, it would take eight large-scale oyster farms harvesting one million (of these) 76 mm oysters per year to remove one ton of nitrogen from the Bay, providing managers with the ability to determine the practical implication of such an ecosystem service."

The Center for Tropical and Subtropical Aquaculture (CTSA) is one of five regional aquaculture centers in the United States established and funded by the U.S. Department of Agriculture's National Institute of Food and Agriculture (NIFA) under grants 2005-38500-15720, 2006-38500-16901, 2007-38500-18471, and 2008-38500-19435. The regional aquaculture centers integrate individual and institutional expertise and resources in support of commercial aquaculture development. CTSA was established in 1986 and is jointly administered by the Oceanic Institute and the University of Hawaii.

