CENTER FOR TROPICAL AND SUBTROPICAL AQUACULTURE

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Letter from the Director

Aloha,

While I prefer to start my monthly messages on a bright note, it is important to honor colleagues when they pass on. This month, we lost two pillars of aquaculture. Mr. Billie Hougart was one of the key individuals who worked tirelessly behind the scenes to establish the Regional Aquaculture Centers at the USDA. Professor Y. C. Shang wrote the much-used textbook "Aquaculture Economic Analysis: An Introduction"and was the co-founder of "The International *Association* of *Aquaculture* Economics and Management." Both will be missed.

The pioneers of aquaculture who have come and gone before us have left big shoes to fill, and the new generation must now take the torch for the future development of the aquaculture industry. I recently joined researchers from the University of Hawaii at Manoa to visit several aquaculture firms at NELHA on the island of Hawai'I. Every company we visited expressed the same serious challenge: recruiting skilled workers in and to Hawaii. At the same time, many high school teachers --including our CTSA education project partner Jeff Garvey from Waipahu High-- have expressed students' desires to receive hands-on training in aquaculture. CTSA has long considered capacity building as a top priority for our region. The recent comments I have received further demonstrate the need for workforce training opportunities for our local students. This is especially pertinent in consideration of the increasingly strong support for aquaculture in the Hawaii state legislature, as seen through numerous aquaculture related bills and other activities.

I would like to take this opportunity to express my sincere appreciation to State Senators M. Gabbard and H M. Richards III, as well as Representatives C. A. Gates and K. Kahaloa, who co-sponsored Agriculture Day on Feb. 9 at the State capitol. The event was well received and attracted hundreds of residents, including many who stopped by the CTSA booth (pictured). I would also like to extend my appreciation to Professors Harry Ako and Jinzeng Yang for helping Maggie and I at the CTSA booth, which allowed me to visit other booths. I was pleasantly surprised to find several projects and organizations focused on food production education for K to 12 students. I believe this is a critical step to increase local food production in Hawaii. In our next issue of e-Notes, we will feature an update on our in-house education program.

Mahalo,
Dr. Cheng-Sheng Lee
Executive Director, CTSA

CTSA 2022 Annual Progress Report 'Project Summaries'

As part of our NIFA reporting requirements, CTSA must submit a comprehensive Annual Accomplishment Report to the USDA. This 100+ page report features full progress reports of ongoing CTSA-supported projects, as well as final reports of projects that were completed during the calendar year.

In an effort to consolidate information for our stakeholders, CTSA has prepared a 2-page summary of each project that was active during 2022. Each summary provides a brief description of the project, as well as the anticipated benefits, impacts, and current progress of the

work being done. Click here to download the Summaries. The following are brief highlights from some of the ongoing and recently completed projects:

Improving the Commercial Aquaculture Feasibility for Yellow Tang (*Zebrasoma flavescens*): Resolving Early Bottlenecks to Improve Culture Yield
Yellow Tang is the most heavily collected reef species from Hawaii with nearly 300,000 fish being removed from reefs annually for the aquarium trade. In 2015, OI was successful in overcoming the tremendous challenges culturing this important species. For the first time, the culture of Yellow Tang was shown to be technically possible, and this achievement provided the pathway for many other reef species to be cultured using similar methods. However, despite these exciting successes, commercial adoption of production remains low due to limited efficiency of current production methods. Several constraints must be overcome before the wide-scale adoption of culture methods can be realized. This project sought to address these challenges by building upon prior successes and recent collaborations with other partner institutions to significantly improve the yield of Yellow Tang production. Prior to this three-year project, mean survival of hatchery produced yellow tang was right around 1% (egg to juvenile). This project, in conjunction with work done under a parallel contract with Biota, successfully improved rearing protocols resulting in mean survival of 3-5%, with a record of 6-7% in a few runs. The primary reasons for this improved survival are increased pH of rearing system, and enhanced weaning onto Gemma (by Skretting) microdiets. The results of this work are immediately being implemented into rearing protocols in Biota's commercial hatchery in Hawaii.
The commercial captive culture of Yellow Tang will help to alleviate pressure on wild stocks of this highly desirable species.

Herbivorous reef fish *Kyphosus vaigiensis*: fishpond and commercial potential
This project is aiming to improve the culture of a locally popular herbivore*Kyphosus vaigiensis* (aka 'nenue'). One part of this project is addressing optimum grow-out diets for this fish to determine if commercial production is feasible. Tank-based trials are testing existing commercial feeds for herbivores to see if nenue can achieve commercially viable growth without engineering a new diet. This would allow for rapid assimilation into existing commercial schema, but with plant-based diets - a step toward increasing global protein production without exploiting forage fish resources. Alongside commercial potential, researchers are investigating community impact by introducing this fish to a Hawaiian fishpond partner. A native herbivore could burgeon fishpond productivity by grazing down algae overgrowth and providing food fish at the same time. To date, approximately 20,000 Nenue fingerlings have been produced by Ocean Era. Several hundred of the fish were sent to O'ahu where they are housed at the Oceanic Institute and at Sea Grant's facility at the Waikalua Loko I'a. Work is in progress to determine growth data in fishponds; fish are kept in tanks as the fishpond does not have the conditions to hold high numbers of fish. In addition, juvenile fish are being kept in tanks at Ocean Era to determine if intensive production is possible for this species. The feed trial began in late 2022; results will be presented in the next project report. Hawai'i Sea Grant staff have been working with members of the Pacific American Foundation Waikalua Loko I'a (Hawaiian fishpond) to train them in the culture of the nenue. Since the fish were received, training has begun with two staff members. Eventually, the project group will do more significant outreach with fishponds and hold a workshop to disseminate culture methods.

Click here to read the full report

Aquaculture Announcements

DOE Requesting Information on Aquaculture and Ocean Energy

The U.S. Department of Energy's Water Power Technologies Office (WPTO), in collaboration with the Wind Energy Technologies Office, recently released a Request for Information (RFI) to better understand the needs, challenges, and opportunities related to co-location and co-development of aquaculture and ocean renewable energy, including both marine energy and offshore wind energy.

WPTO may use these responses to inform strategies and investments in marine energy and aquaculture co-location research and development. They are especially interested in hearing from those who work in marine aquaculture, marine energy, or related fields in industry, academia, and other non-government organizations.

The RFI is listed here: Offshore Renewable Energy and Aquaculture RFI. Questions related to aquaculture are under Topic 2: Offshore Renewable Energy and Aquaculture Synergies. Category 1 questions are relevant for aquaculture and offshore renewable energy in general, and Category 3 questions are specifically relevant for marine energy (waves, tides, currents, and thermal gradients). These questions ask about research and data needs, energy decision making for aquaculture, and inclusive planning for co-

located aquaculture and marine energy. Respondents do not need to answer to every question.

Responses are due by 5 PM ET on March 15 by submitting a word document as an email attachment to WindEnergyRFI@ee.doe.gov. If this submission process poses a challenge to someone who would like to respond to questions in Topic 2 Category 1 and/or 3, they could alternatively reach out to WPTO by contacting Sarah Loftus (sarah.loftus@ee.doe.gov) and Nina Joffe (nina.joffe@ee.doe.gov).

Reminder: Sign Up For 2022 Census of Aquaculture

The 2022 Census of Agriculture is right around the corner and USDA NASS is making every effort to count all aquaculture producers in the United States. If you produce any aquaculture products and want to make sure that you are counted in the 2022 Census of Agriculture and the 2023 Census of Aquaculture, please sign up your operation using this online form: https://www.agcounts.usda.gov/cgi-bin/counts/. Once you have signed up, you might receive a short survey in the next two years to further categorize your operation.

AquaClip: NMC-CREES push aquaculture development in CNMI

Northern Marianas College's Cooperative Research, Extension, and Education Services has completed the first series of community input meetings with the CNMI Aquaculture Producers, regulatory and permitting agencies, resource agencies, business community and stakeholders.

The study is being conducted by the Oceanic Institute of Hawaii Pacific University, which was selected for its extensive knowledge in all aspects of aquaculture and familiarity with the CNMI and Asia-Pacific region. The feasibility study is the first step toward guiding the development of aquaculture in the CNMI. Feedback gathered from the community will be incorporated into the study to help guide the development and content of the document.

The meetings were well attended with over 90% of the invited participants attending. Shaun M. Moss, Ph.D., executive director of Oceanic Institute of Hawaii Pacific University, expressed satisfaction with the outcome.

"Our meetings with community stakeholders [on] Saipan, Tinian, and Rota over the past three days were very productive," Moss said. "Participants provided valuable insights and recommendations which will inform our decisions on how best to design the aquaculture parks with the overall goal to help catalyze the development of a robust and sustainable aquaculture industry here in the CNMI."

Mike Ogo of NMC-CREES' Aquaculture and Natural Resources program expressed his gratitude for the excellent feedback from the stakeholders and how it will be incorporated into the study.

"We are especially thankful for the excellent responses from those present which will help OI formulate the content of the study based on the stakeholder's feedback," Ogo said.

"It was wonderful to have representatives from the private sector, regulatory agencies, higher education, and economic development authorities present at the meetings. We look forward to sharing the results of the study with the community in the summer of 2023," said Patty Coleman, interim dean of NMC-CREES.

The CNMI Aquaculture Feasibility Study is due on June 30, 2023, and is a grassroots study with content driven by the desired species, facilities, farming, or production methods of the stakeholders with the guidance of the Oceanic Institute. NMC looks forward to the completion and submission of the study and hopes it will help catalyze the development of a robust and sustainable aquaculture industry in the CNMI.

"This feasibility study is an important step toward realizing the potential of aquaculture in the CNMI and I am excited to see the valuable feedback provided by the community being incorporated into the study," NMC president Dr. Galvin Deleon Guerrero said. "I am confident that this study will pave the way for the development of a vibrant and sustainable aquaculture industry in the CNMI."

Source: Saipan Tribune // Original Article

This newsletter is written and prepared by the CTSA Information Specialist Meredith Brooks.
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 active grants 2018-38500-28886, and 2020-38500-32559. 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 University of Hawaii and the Oceanic Institute of Hawaii Pacific University.

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