CENTER FOR TROPICAL AND SUBTROPICAL AQUACULTURE

Regional e-Notes ~ June 2024 ~ Volume 16, Issue 6

Letter from the Director

Aloha,

The CTSA FY24 development cycle is well underway, and I am pleased that we received 27 pre-proposals addressing the priorities proposed by stakeholders across our region. I am especially excited to see several pre-proposals from new researchers! The package of pre-proposals now goes to our Industry Advisory Council and Technical Committee for their review and voting.

While we wish we could fund all of your good ideas, CTSA does not have sufficient funds to support every proposed project. Those not selected to move forward are strongly encouraged to consider the comments that will be provided by our IAC and TC and resubmit your idea in the future. One of the keys to a successful pre-proposal is a clear demonstration of the project's potential impacts to regional aquaculture; this helps ensure that our funded projects are in line with our program mission to help facilitate profitable and sustainable aquaculture in the U.S. Pacific Islands.

On that note, I am excited to see the potential economic returns from the projects that CTSA has already supported. Recently, the PI of our macroalgae project Dr. Karla Smith (UH Hilo) was approached by a Japanese company to assist in their investigation into Hawaii macroalgae for Japanese markets. They are very pleased with some of the species being investigated by Dr. Smith and are looking forward to identifying more for their investment in Hawaii. Macroalgae has attracted much attention in recent years, and the species Dr. Smith's team is working on hold great potential to create new revenue for our local aquaculture industry.

Indeed, there are many opportunities for aquaculture economic development in our unique region. I enjoyed my recent visit to Moana Marine Biotechnology, a company focused on genetic improvement for shrimp. Moana Tech has maintained over 100 core black tiger shrimp families at their highly bio-secure facility in Host Park, and marketed SPF stocks to shrimp farms worldwide. I was very impressed with their complex and well-planned operational procedures to maintain biosecurity, which require significant commitment from every staff member to run the business successfully. A unique characteristic of the company is that staff from different nations and cultural backgrounds work together like a family to ensure that only the highest quality products are shipped from the facility. The management team has done a wonderful job and remains available on call 24/7. The operation serves as a wonderful role model for a successful commercial aquaculture operation, and I hope we see more sustainable operations like it come online across our region in the near future.

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

Register Now for the CTSA Feed Mill Workshop: July 25

Hawai'i is the most remote archipelago on Earth; close to 90% of its food, including seafood, is imported. Hawai'i has the water resources and favorable climate conditions for aquaculture. However, industry development in the islands has faced several roadblocks, a key one being lack of affordable local feed sources. The limited availability of affordable feed has hindered the expansion of aquaculture in the region, and a key question remains: can feed be feasibly produced in Hawai'i?

To help answer this question, NOAA awarded a grant to an interdisciplinary team from the Center for Tropical and Subtropical Aquaculture (CTSA), UH CTAHR and UH Sea Grant. As part of the grant, the group is hosting a series of workshops to engage with stakeholders. The next workshop is July 25 and you are invited to attend! The workshop is a continuation of the previous workshop held in October 2023.

At the July 25th workshop, we will review the background of local feed mill operations, input data into the economic feed mill model developed for this project, and develop strategies for affordable feed supplies.

The meeting will be held from 9am - 4pm HST in Room 219 of the Agricultural Science building on the UH Manoa campus, and online via Zoom. Please click here to register by July 15, 2024

The tentative agenda is below. Questions? Contact myma@hawaii.edu or (808) 956-3974

09:00 – 09:15	Welcome & Introduction	Cheng-Sheng Lee CTSA/University of Hawaii
09:15 – 09:35	Workshop Objectives & Format	Tony Ostrowski AquaSource International
09:35 – 09:55	Status of the DHS feed mill project	Ryan Murashige Diamond Head Seafood
09:55 – 10:15	Potential of the OI/HPU Hilo feed mill	Tony Ostrowski AquaSource International
10:15 – 10:35	Key Components of feed mill operations	Sajid Alavi Kansas State University
10:35 – 10:55	Status of Agriculture production in Hawaii	Jensen Uyeda University of Hawaii
10:55 – 11:15	Economic model for feed mill operations	Stuart Nakamoto University of Hawaii
11:15 – 12:00	Q & A	
12:00 – 13:00	Lunch Break	
13:00 – 15:00	Economic model iterations and strategies for affordable feed supply	All participants
15:00 – 15:30	Workshop summary	Tony Ostrowski AquaSource International
15:30 – 15:45	Closing remarks	Cheng-Sheng Lee CTSA/University of Hawaii

CTSA FY23 Projects Begin This Summer

The following new projects included in the CTSA FY23 Plan of Work have been approved and are set to begin this summer:

Uncovering Genetic Markers of Thermal Tolerance in Pacific White Shrimp
PI: Yanghua He, University of Hawaii at Manoa
The aquaculture industry faces a significant challenge due to the adverse impacts of rising ocean temperatures resulting from global climate change. This has a detrimental effect on the health and performance of Pacific White Shrimps,

particularly in Hawaii, a significant shrimp broodstock producer. The need to maintain precise water conditions and temperature control during live shrimp transport to international destinations poses a considerable obstacle for the industry. This project aims to address challenges faced by Hawaii's shrimp broodstock producers during the international transportation of Pacific White Shrimps (*Litopenaeus vannamei*) and mitigate the adverse effects of rising ocean temperatures. The project's core objective is to comprehensively investigate the impact of heat stress on shrimp growth, oil production, physiological responses, and genetic changes under varying heat stress conditions and recovery phases. The ultimate goal is to identify heat stress indicators and genetic markers related to thermal tolerance. Additionally, the research group seeks to examine if these phenotypic and genotypic alterations caused by heat stress can be reversed upon stress removal. These findings will significantly contribute to the selection and breeding of resilient Pacific White Shrimp, emphasizing high-quality meat and oil production to combat global warming challenges.

Development of an Integrated Multitrophic Aquaculture System for Hawaii
PI: Dustin Moss, Oceanic Institute of Hawaii Pacific University
More than 85% of Hawaii's food is imported, making local communities extremely vulnerable to food supply chain disruptions. Because of this vulnerability, it is imperative that Hawaii develop pathways to increase local food production, including aquaculture. In addition to enhancing food security, increasing local food production would provide enormous economic benefits to the State. This project focuses on the development of a multi trophic aquaculture system (IMTA) that produces high-value species in an environmentally sustainable manner. The proposed IMTA system will grow Pacific white shrimp, *Litopenaeus vannamei*, in raceways receiving exogenous feed. Effluent from the shrimp raceways will flow to adjacent tanks containing Manila or Japanese littleneck clams, *Venerupis philippinarum*, to remove particulate matter from the effluent, then flow to tanks containing a native seaweed, *Gracilaria parvispora*, (or "ogo") to remove dissolved nutrients. Supporting objectives of this project include: 1) establishing a research-scale IMTA system to test the impacts of stocking density production and the biofiltration and bioremediation capacity of clams and seaweed, 2) conduct a test trial of a commercial-scale IMTA system to identify design and operational modifications required to improve production and biofiltration and bioremediation, and 3) disseminate results to local stakeholders. If successful this project will provide valuable data and design criteria for the development of land-based IMTA systems in Hawaii. Ultimately, increasing aquaculture production will increase food security of local communities by reducing the State's reliance on imports.

Establishing an Aquaculture Workforce Development Program: Bridging the Education Gap in Hawaii
PI: Jeffrey Garvey, Hawaii Department of Education, Waipahu High School
Hawaii's aquaculture industry is an important part of the state's economy, contributing US$ 79.7M in 2021. However, there is a significant skills gap among incoming local workers, which hampers its expansion. As a temporary solution, jobs are outsourced to non-local workers who have already been trained. At the same time, local residents seeking to enter the field face limited opportunities for specialized training (i.e., educational pathways and formal college degree programs in aquaculture). Currently, there are no active statewide-focused workforce development programs for aquaculture; this project aims to establish one. The overarching goal of this project is to improve and expand aquaculture education across high schools, community colleges, and four-year colleges in Hawai'i by establishing a certificate program, as well as training educators and industry stakeholders. It will help build institutional and governance capacity in agencies and non-profit organizations that have a stake in aquaculture and related sectors, such as fishing. The proposed activities will unify and elevate aquaculture education, targeting various educational stages (high school, community college, and universities) in Hawai'i by utilizing a modular curriculum design that is adaptable to specific needs (i.e., specialized aquaculture skills, knowledge of local ecological considerations, and technological proficiencies required). The newly developed curriculum will prepare students for immediate employment and advanced studies. Included in the curriculum will be collaborations with industry stakeholders to ensure real-world applicability and to introduce avenues for research and internships. Although initially deployed in-person on O'ahu and Hawai'i Island, the curriculum is structured for potential geographic and institutional expansion, facilitated by remote-access options.

Registration Open for KSU Extrusion Workshop:
Click Here to Learn More and Register

IGP Institute

Extrusion Processing: Technology and Commercialization

Special 1-Day focus on Plant-based Meat

August 13–16, 2024
IGP Institute Conference Center
Dept. of Grain Science and Industry
Kansas State University
Manhattan, Kansas USA

Optional Supplement:
Pet Food Workshop
August 12, 2024

KANSAS STATE UNIVERSITY

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Course Outline

Day 1 – August 13 (Tuesday)

7:30 a.m. Registration
8:00 a.m.
- Ingredient Functionality
- Extrusion Hardware and Design
- Extrusion Operation and Process Variables
- Extrusion Applications – Food

12:30 p.m. Group Luncheon
1:00 p.m.
- Extrusion Applications – Feed and Pet Food
- Hands-on Session on Pilot-Scale Extruders

6:00 p.m. Banquet

Day 2 – August 14 (Wednesday)

8:00 a.m.
- Business Plan: Capital Decision Making
- Business Plan: Strategic Planing
- Business Plan: Case Study and Active Interaction
- Principles of Die Design

12:30 p.m. Group Luncheon
1:00 p.m.
- Extrusion Troubleshooting
- Hands-on Session on Pilot-Scale Extruders

Day 3 – August 15 (Thursday)

7:15 a.m. Field trip to Wenger Manufacturing
- Textured Protein/Plant-based Meat Ingredients
- Extrusion Application – Textured Protein/Plant-based Meat Products
- Wenger Plant Tour

3:00 p.m. Hands-on session
- Pilot-scale Extrusion for Textured Protein/ Plant-based Meat

Day 4 – August 16 (Friday)

8:00 a.m.
- Sensory Aspects of Extrusion Products
- Drying and Toasting
- Instrumental/Analytical Techniques and
- Troubleshooting
- Overview of the Product Development Process

12:30 p.m. Group Luncheon and Certificate Distribution

North Central Regional Aquaculture Center Hires New Director

The NCRAC is excited to announce that Dr. Thomas Detmer has been hired as its new Director. Dr. Detmer will start his new position in January 2025. The following is a short bio: "My name is Tommy Detmer, and I am a broadly trained aquatic ecologist focused on improving the resistance and resilience of both aquatic ecosystems and sustainable aquaculture. I earned a Ph.D. in Ecology and Evolutionary Biology from the University of Colorado at Boulder, where I also graduated summa cum laude with a B.A. majoring in Environmental Studies, Ecology and Evolutionary Biology, and Geography. My research and administrative experiences have taken place at the Illinois Natural History Survey at the University of Illinois and with the Adirondack Fishery Research Program at Cornell University, where I have worked with a variety of partners. My current research focuses on assessing and addressing challenges related to invasive species and climate change, with a particular interest in developing tools to help protect aquatic ecosystems and related industries from current and future challenges. I also like working with young scientists to further expand their interests in fisheries and freshwater ecology. In my free time, I enjoy fishing and going on adventures with my family."

AquaClip: 'Fishponds in Hawaii' from Oceanographic Magazine

On a bright July afternoon, as the birdsong swelled and the tide started coming in, I drove down a dirt road in my grandfather's old silver SUV. The road led me through a farm gate, past a sign that warned 'KAPU' – restricted – in bright red, down a steep incline, along a grove of papaya trees, past a small green shed, and eventually, to Moli'i Pond.

Moli'i Pond is a 128-acre fishpond in the northern fold of Kāne'ohe Bay, on O'ahu in Hawaii. Its water is translucent green. Its shoreline is muddy and viscous. Mangroves grow along the fishpond perimeter, and their pneumatophores drive ripples in the pond's surface. A thin scum of yellowish algae floats on the southern side of the pond. Stout palm trees and elongated coconut trees rustle, and the sweeping canopies of hau trees print a kaleidoscope of shadows on the ground. The Ko'olau mountain range hugs the pond. Its ridges dip and swell. The mountains directly behind the pond are jagged and severe. The mountains in the distance slope gently.

I had come to this pond many times before. My father grew up on O'ahu, and he lived on the same block as phycologist and aquaculturist Vernon Sato. In 2006, the Oceanic Institute asked Sato to write a book about Moli'i Pond. He titled it The Keeper of Moli'i Pond, and it recounts the life and work of the former fishpond caretaker, George Uyemura. In the years since his book's publication, Sato has returned to the pond often, and, when my family was in town for the summers, he'd bring us along. We'd fish and talk. To me, Vernon Sato is Uncle Vernon, and the trips we took to Moli'i Pond were formative and enchanting.

Fishponds are an ingenious form of aquaculture engineered by the ancient Hawaiians. More than 900 years ago, as their population was growing into the hundreds of thousands, the Hawaiians realised that they needed to have fish available in case of a poor catch or a surprise visit from royalty. They noticed that fish came to the estuarine waters where freshwater streams flowed into the ocean. The Hawaiians fenced in these areas with lava rock walls, called kuapā. They built sluice gates, called mākāhā, that allowed small baby fish to swim into the ponds from the ocean. The fish grew so fat within the pond – on chain diatoms and seaweeds that flourished in the nutrient-rich brackish shallows – that they couldn't fit through the mākāhā to swim back out to the ocean. This way, the Hawaiians could always catch fish from their ponds.

Fishponds were operated by fishpond caretakers, or kia'i loko. They understood the pond's cycles and needs, and they understood how the ponds changed with the tides and the seasons. They learned successionally, through apprenticeship. To care for a fishpond was an art, and it took years to master. This art was lost when the West colonised the islands. The fishponds languished. Then, invasive species and overpopulation disrupted the processes that powered the fishpond system. Many fishponds were filled in and developed into neighbourhoods.

In the latter half of the 20th century, encouraged by the Hawaiian Cultural Renaissance, community groups started organising to restore the fishponds. They wanted to grow fish again...

Source: Oceanographic Magazine // Read Full 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 2020-38500-32559 and 2022-38500-38099. The regional aquaculture centers integrate individual and institutional expertise and resources in support of commercial aquaculture development.
CTSA was established in 1986 and is administered by the University of Hawaii.

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