CENTER FOR TROPICAL AND SUBTROPICAL AQUACULTURE

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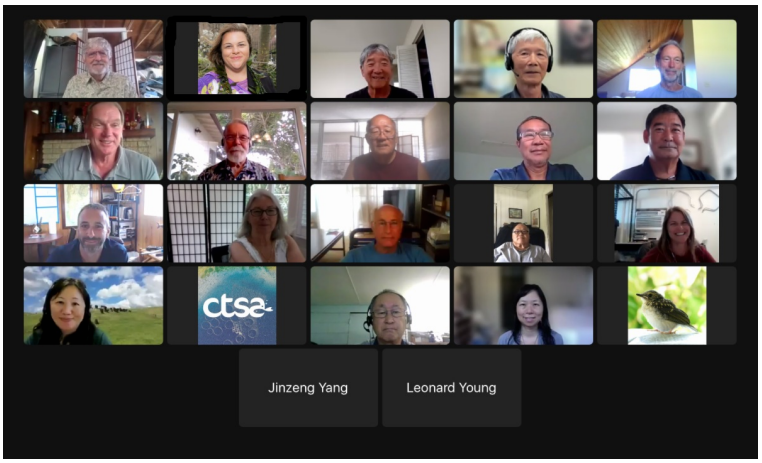
Letter from the Director



Aloha,

Earlier this month, CTSA held our Industry Advisory Council (IAC) and Technical Committee (TC) meeting to discuss and vote on the 20 pre-proposals that we received for FY23 funding consideration. The annual meeting is one of the most critical steps in the CTSA development process. Not only is it the first round of CTSA project selection, but it is also an opportunity for aquaculture stakeholders from across the region to gather and discuss industry priorities and steps to achieve shared development goals. I encourage those pre-proposals that did not receive votes from at least 50% of the committee to continue pursuing intentions of helping develop regional aquaculture, which I appreciate very much. I hope the project work groups will reassess their proposed focus areas in conjunction with the appropriate local aquaculture stakeholders, and consider re-submitting their ideas to address the industry-identified critical needs during our next call for pre-proposals.

I would once again like to express my sincere gratitude to our IAC and TC Chairs, Co-Chairs and members for their dedication to the program and regional aquaculture development. The purpose of the TC is to evaluate the scientific merit of the pre-proposals submitted to CTSA, while the IAC provides an open forum through which those involved in the business of aquaculture can provide comments, funding suggestions, and other input. Members from both committees also serve as project liaisons to ensure each CTSA-funded project remains on track to achieve its objectives and anticipated impacts.

At this year's meeting, we welcomed a couple of new members to the groups. I am so happy to witness the collaborative nature and efforts of both our new and seasoned members, who are each wholeheartedly focused on sustainable regional aquaculture development. CTSA is always on the lookout to add new industry and technical voices to our committee discussions; if you or someone you know is interested and qualified to serve on one of the committees, please reach out to me or email ctsa@hawaii.edu to begin the consideration process. As I often say, we can go much further when we work together.

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

CTSA FY22 Plan of Work Projects Begin This Month

The following CTSA FY22 Plan of Work projects have been approved and either begin this month or are set to begin before the end of this year:

Initial Land-Based Growth Evalua Initial Land-Based Growth Evaluation of Cultured Kūmū (*Parupeneus Porphyreus*) Juveniles
PI: Chad Callan, Oceanic Institute of Hawaii Pacific University
Known locally by its Hawaiian name, Kumu, the endemic whitesaddle goatfish (*Parupeneus porphyreus*) is a highly esteemed food fish and has historically been an important

species in the culture of the local fishing community. Long considered one of the most valuable reef fish in Hawaii, Kumu (whole fish) have a recent market price of up to $40/kg. Although once an abundant species, having been the most common member of its genus on Hawaiian inshore reefs, Kumu catch rates have since fallen dramatically. An on-going, NOAA funded project at the Oceanic Institute (OI) has already acquired kumu broodstock and achieved initial success in spawning and early larval description. OI has developed effective methods for broodstock conditioning, live feeds production, and larval rearing of challenging marine species, which have recently been applied with great success to culture yellow tang and red coral grouper at commercial scale. This CTSA project will collect initial data on the growth of kumu juveniles to evaluate their potential for larger scale aquaculture production. The overall goal is to assist in the establishment of a new species for aquaculture in the region by evaluating the growth potential of kumu juveniles for the first time.

Assessment of Hawaiian Aquaculture for Disease Mitigation and Control
PI: Jenee Odani, University of Hawaii at Manoa
A primary goal of this one-year project is to address the needs for Hawaii aquaculture producers with regards to diseases of concern. The project will focus on in-depth conversations with aquaculture stakeholders to establish the greatest areas of concern in terms of pathogens and disease related-issues. Secondly, the research group will assess the feasibility of tilapia farmers to enter a SPF (specific pathogen free) certification program, while following SHCP and CAHPS guidelines and develop a best management practices (BMP) manual for tilapia producers. Another focus is to explore locally available resources to determine their suitability for producing probiotic cultures to be used in aquaculture and evaluate the inhibitory activities of produced probiotics against tilapia pathogens. Additionally, they intend to continue testing at the local laboratory (UHADL) for OIE shrimp diseases, koi herpesvirus (KHV) in koi, and Ostreid herpesvirus (OsHV-1) in oysters.

Āholehole - The Next Tilapia?
PI: Maria Haws, University of Hawaii at Hilo
Development of native fish species for aquaculture in Hawai‘i and the U.S. Affiliated Pacific Islands (USAPI) offers the promise of increasing opportunities for diversification, production of high-value fish, reduction of potential environmental impacts, social acceptance and may ease permitting issues. The Pacific Aquaculture and Coastal Resources Center (PACRC) at the University of Hawai‘i Hilo (UHH) has developed a pool of āholehole broodstock and has begun collecting baseline information on parameters such as broodstock conditioning, spawning requirements, feeding rates, larval development and juvenile growth. This is the first documented experience with producing āholehole in a semi-commercial scale hatchery, following initial work by Frank Baensch in 2018 with hatching eggs collected from the wild. This CTSA project will support further research into optimizing and scaling-up aquaculture of this promising species in an effort to lead to new opportunities for commercial production. Additionally, specimens obtained as a byproduct of this work will be distributed to commercial producers and loko i‘a for testing in those systems.

Expanding Aquaponics in American Samoa
PI: Jinzeng Yang, University of Hawaii at Manoa
Approximately 10 years ago, CTSA conducted an aquaponics project targeting American Samoa. This proposal takes advantage of and builds upon that and other past work and aims to integrate economic considerations in local aquaponics production, as well as advance the art in sizing different components of aquaponics systems relative to each other as well as sizing aeration rates, water pumping rates, and denitrification prevention due to too low dissolved oxygen levels in the grow beds. Many of the advances are in progress of being tested at the recently completed system at Kahauiki village for the formerly homeless, another previous CTSA project. The project will take also advantage of recently adapted zoom technology for technology transfer over the internet, while daily work will be advised by an on the ground extension agent in American Samoa.

Developing Affordable and Efficient Photobioreactor and Biofiltration Systems with Fungal Filters to Grow and Harvest Microalgae
PI: Zhi-Yan (Rock) Du, University of Hawaii at Manoa
A major challenge for algal products is how to harvest microalgae due to their small size. The harvesting cost can account for up to 50% of the total production cost with conventional methods such as chemical flocculation and centrifugation. These methods are also limited by other problems, such as contamination and pollution during flocculation and high demand for instruments and maintenance. Thus, an economical and environmentally friendly method to harvest microalgae is needed to meet the demand for the booming algae market. Inspired by the observation of algae aggregates in fungi-contaminated culture, the research group has developed a highly efficient flocculation method using fungal mycelium. In this CTSA project, with the algal culture from the newly designed PBR, they will develop a BioCube system using natural fungal filters: (mycelium incubated with optimized media for best performance). They will focus on: 1) Controlling the growth conditions and optimizing the algal growth and biomass with the new PBR to provide algal cultures for further harvesting with BioCube; 2) Improving algae harvesting efficiency using

commercially valuable algae at specified concentrations; 3) Optimizing the fungal filters for filtration; 4) Develop commercial prototypes with polycarbonate materials using the design tested with 3D-printed models. The fungal filters will be developed with oleaginous fungi such as Mortierella that have been used for producing nutraceuticals like omega-6 arachidonic acid. Both the fungal and algal biomass are enriched in proteins and oils, and they can be used directly as feedstocks for aquafeed and nutraceuticals. The combination of PBR and BioCube will provide an affordable, efficient, sustainable, and environment-friendly solution for aquaculture and algal industries.

Macroalgal Biomass Production for High-value Product Generation with Nanobubble Technology and Phase-change Materials: Lab-to-Pilot Scale Study
PI: Samir Khanal, University of Hawaii at Manoa
Macroalgal growth is affected by several factors. The delivery of CO2 gas is one of these major factors. Large bubbles (i.e., macrobubbles, ≥ 1 µm in diameter) quickly rise to the surface of the surrounding aqueous phase, lowering CO2 mass transfer. Since macroalgae rely on exogenous carbon, the availability of aqueous CO2 limits the growth of most macroalgae. Additionally, high temperatures can induce thermal stress in outdoor commercial macroalgal raceway ponds, which slow growth. Therefore, it is critically important that innovative technological solutions are implemented that address issues limiting macroalgae production. To address these issues, this CTSA project will utilize cutting-edge bubbling technologies to generate and deliver CO2 nanobubbles (NB) along with using phase-change materials (PCM) for regulating temperatures to significantly improve macroalgal biomass production. NB are spherical, gaseous bubbles suspended in aqueous solutions that cannot be seen with the naked eye due to their size (~50-200 nm). Their movement is primarily through Brownian motion. As a result, NB have long retention times that enhance gas-liquid mass transfer. PCM have the unique ability to absorb and release heat by changing between solid and liquid phases. This phase transition phenomenon allows an object outfitted with PCM to have low-temperature fluctuations. As outdoor macroalgal race ponds experience extreme temperatures, PCM could manage less thermal shock to macroalgal cultures. In addition, PCM allows for efficient heat dissipation with a potentially low-cost footprint compared to conventional cooling.

Request to Participate in USDA NIFA SBIR Aquaculture Program Panel

The USDA NIFA SBIR program - Aquaculture - Topic Area 8.7 would like to request your availability for an upcoming virtual (zoom) panel meeting scheduled for three days (10am-5pm EST each day) during 5-7 December 2023. Each panelist will be assigned 8-10 proposals to review in advance. We expect to have proposals to our panelists before our panel orientation meeting scheduled for 11 October 2023 from 4-5pm EST. During the panel, many panelists find the discussions and peer interactions to be enjoyable and rewarding, besides providing a service to their community of scholars. If you or your spouse plan to have a proposal submitted to this particular SBIR Aquaculture program, you will be ineligible to serve on the panel and you should decline to participate. We appreciate your consideration.

AquaClip: Hawai'i Department of Agriculture Seeking Comments on Resilient Foods Systems

The Hawai‘i Department of Agriculture (HDOA) is seeking public comments through Aug. 11, 2023, on funding priorities being developed for the U.S. Department of Agriculture (USDA) Resilient Food Systems Infrastructure Program (RFSI). Hawai‘i has been earmarked for $3.2 million in block grant funding; however, the program requires HDOA to conduct outreach to stakeholders to determine the priorities for the state application.

The purpose of the RFSI program is to develop and administer state-coordinated initiatives to build the resilience of the state’s food supply chain for food crops.

In partnership with the USDA, the HDOA will administer competitive solicitation to award grants to support infrastructure in the middle of the supply chain for local food and farm businesses and other eligible entities.

Funds will support expanded capacity for the aggregation, processing, manufacturing, storing, transporting, wholesaling, and distribution of locally produced food products, including aquaculture, specialty crops, dairy, and other food products, excluding meat and poultry. Examples of eligible project objectives include:

- Modernizing processing and manufacturing equipment
- Supporting the construction of a new facility
- Modernizing or expanding an existing facility
- Improving operations through training opportunities
- Modernizing manufacturing, tracking, storage, and information technology systems
- Improving the capacity to comply with federal, state, and local food safety requirements
- Enhancing worker safety through the adoption of new technologies or investment in equipment or facility improvements

For a full description of program objectives and eligible projects, visit the USDA RFSI program factsheet at: https://www.ams.usda.gov/sites/default/files/media/RFSIFactSheet.pdf

Source: Governor.Hawaii.Gov

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.

Center for Tropical and Subtropical Aquaculture
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