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TROPICAL AND SUBTROPICAL
AQUACULTURE

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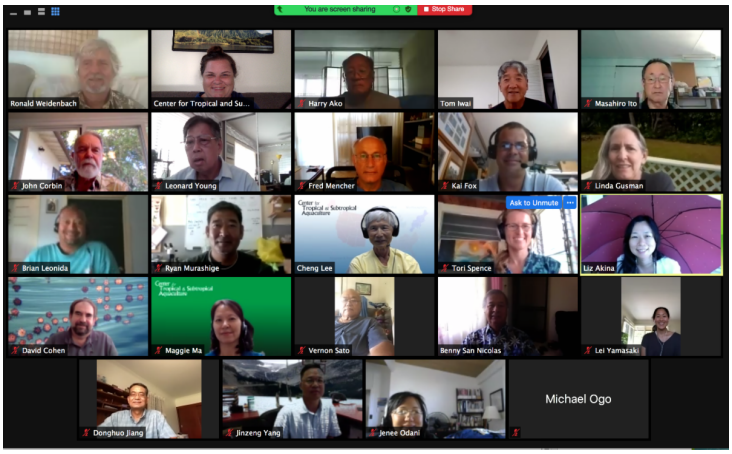
Letter from the Director

Aloha,

As we enter the fourth month of the so-called 'new normal,' my team and I once again hope that this newsletter finds you safe and sound. As I have said for the last few months, the tragic toll of the global pandemic cannot be understated, and we first and foremost wish to send our condolences and healing thoughts to all who are experiencing hardship through this crisis.

I have recently been thinking a lot about the Chinese term for crisis, which is composed of two words: challenges and opportunities. The current Covid crisis has certainly presented CTSA with challenges and opportunities, mostly related to the way our program and project PI's interact with stakeholders, committee members and others. We have had to create our own 'new normal' in order to complete our development, project monitoring and information dissemination tasks. At the beginning of the month, we held our bi-annual conference calls with PI's to discuss project updates (detailed article below). While we found that many projects are experiencing some level of difficulty due to the pandemic, most are finding innovative ways to complete their objectives. One example is the Rabbitfish project in Palau. Together with project PI's Miguel de los Santos (Palau Community College) and Chad Callan (Oceanic Institute), CTSA helped organize a virtual workshop in place of the planned in-person seminar. The training covered hatchery production, larval rearing and grow-out of rabbitfish, one of the most popular food fish species in the Western Pacific. While a typical training of this type may attract five or so people locally, the virtual platform allowed for the attendance of nearly four times as many farmers, resource managers, and researchers from throughout the region. The participant consensus at the end of the three-day training was that it was useful and informative.

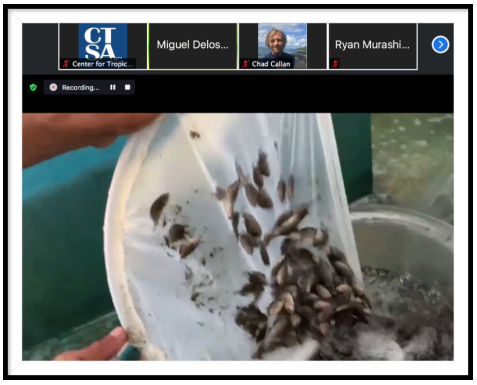


Another opportunity to extend CTSA's reach farther than usual came in the form of our annual joint Industry Advisory Council (IAC) and Technical Committee (TC) meeting, which was held yesterday via Zoom (see picture). The meeting was completed in an efficient manner with limited technical challenges, and was attended by members based in the Western Pacific who might not normally be able to attend in person meetings on Oahu. I am very appreciative to all of our members for taking the time to attend and share their critical input on the 17 pre-proposals that CTSA received in response to our FY20 request. Now, my team and I will work to draft the Requests for Proposals, continuing our normal development cycle during this very abnormal year.

Nothing can replace in-person interaction with our friends and colleagues, but we are grateful that Zoom and similar virtual tools can be used to overcome the common disadvantages of

distance in our unique, isolated region. We look forward to the day we can once again gather together for a meeting or special occasion. On that note, I would like to extend my deepest sympathies regarding the passing of our friend and colleague Dr. Paul Bienfang. CTSA will share a commemoration of Paul's life and his significant contributions to the aquaculture industry in next month's issue of e-Notes. Since we are unable to collectively mourn and celebrate his life in-person, we invite anyone who knew Paul to share your wishes, stories, or other sentiments to include in our commemoration; please send to mbrooks@ctsa.org by July 25. His passing coupled with the current global situation are reminders of how precious life is, and... **Read More**

CTSA Rabbitfish Hatchery Workshop a 'Virtual Success'



The ongoing CTSA project "Improving Rabbitfish Seed Production Capacity in Palau" held a three-day virtual training workshop on June 21, 22, and 23. The workshop covered the hatchery, nursery, and grow-out protocols for the farming of rabbitfish, a popular food fish throughout the Western Pacific region.

The workshop was led by researchers and project Co-P.I.'s Miguel de los Santos of Palau Community College (PCC) and Dr. Chatham Callan of the Oceanic Institute of Hawaii Pacific University (OI). Trainees learned basic tools for rabbitfish hatchery, nursery, and grow-out in Palau, as well as broodstock management, spawning, egg incubation, larval rearing, feed production, and more.

At the end of the workshop, CTSA hosted a discussion with the PI's and other rabbitfish researchers outside of Palau about the current status and future opportunities for rabbitfish production throughout the Pacific region. The primary theme we observed during the discussion was the cultural importance of this fish throughout the Western Pacific Islands. CTSA is currently funding projects working on rabbitfish in Palau and the RMI, and remains dedicated to helping achieve the successful farming of this important species.

The free virtual workshop was held in place of the project's in-person workshop that was postponed due to the Covid pandemic. All three days of the program were conducted and recorded via Zoom. CTSA is currently compiling a resource package that includes the videos and presentations from this training; the package will be released via the CTSA website this summer. If you are a farmer, researcher, or other stakeholder located in the CTSA region who is interested in receiving this package, please email mbrooks@ctsa.org.

Midyear Updates on CTSA Funded Projects: Impact Highlights

During the first two weeks of June, CTSA conducted our bi-annual project update conference calls, which coincide with progress reports due each May. The purpose of these calls is for CTSA staff and a project Industry Liaison to discuss the project progress in depth to ensure it is on track to complete its objectives and meet industry needs. The following are some highlights from ongoing CTSA projects:

Improving cost-effectiveness of producing local aquatic feed from papaya fruit wastes via innovative bioprocessing, Year 2

The first objective of this two-year project was to process papaya culls into nutrient substrates suited for semi-SSF of *Yarrowia yeast* using simple affordable mechanized processing; this was

accomplished during the first year. During the current reporting period, the research group has focused on optimizing and scaling up the semi-SSF of *Y. lipolytica* using waste papaya fruit pulp and seed oil as carbon sources. Primarily, they have focused on optimizing the culture medium compositions and conditions to maximize the yeast biomass production from papaya puree. The optimization studies were conducted with *Yarrowia lipolytica* cultured on a stationary bed of papaya puree placed in inexpensive and commercially available aluminum sheet pans. This simple modification enabled much more efficient aeration while protecting the culture from microbial contamination, and reducing water evaporation loss, during the cultivation. Using this culture system, researchers then investigated the effects of nitrogen sources added to the papaya puree on *Yarrowia* yeast biomass production, as well as the effect of peptone and yeast extract, which are common microbiological nutrients known to serve not only as a nitrogen source but also provide many essential vitamins and cofactors. The group is currently working on optimizing water content during the culture, and further improving oxygenation by incorporating a simple oxygenation method based on a hydrogen peroxide decomposition approach. Next, a tilapia feed trial will be conducted at UH Hilo in the fall of 2020. A full report on the status of this project will be shared later this year.

What's in the gut? A Metabarcoding Approach to Examining Diet in First Feeding Larvae

The first objective of this project is to obtain first-feeding fish larvae of target species from the wild for robust diet analyses. To date, the research group has completed the sorting of larval fish archives from NOAA, including 22,000 individuals representing roughly 60 families that have been sorted in order to locate fish larvae of target species. In addition, bi-monthly plankton tows have been completed in Kāneʻohe Bay. These plankton tow samples are currently being sorted to locate first-feeding target species. To achieve the second project objective of producing and identifying DNA barcodes from stomach contents of marine fish larvae, the project's graduate student first traveled to the TrEnD (Trace and Environmental DNA) lab, located at Curtin University in Perth, Australia. Training she received there included some bioinformatic data analysis. Data obtained from the training showed the molecular stomach content analysis, as well as genetic taxonomic identification of both host (larval fish) and prey type are achievable with various species and developmental stages. Development of methods for determining diet in early stage larvae are underway including which primers to use and how to best analyze the data. Aside from some issues created by the pandemic, the primary difficulty for this project has been finding the target species yellow tang. A full report on the status of this project will be shared later this year.

Diagnosing Prevalent Diseases of Aquacultured Animals in Hawaii

The first objective of this one-year continuation project was to determine which diseases are of concern to fish and shellfish producers, state and federal government and importing countries. Surveys were distributed on four occasions, and thirteen responses from farmers were returned and compiled. Based on the survey, six diseases were selected for inclusion in this project for PCR detection: Tilapia Lake Virus, Koi Herpesvirus, Spring Viremia of Carp, Streptococcus iniae, Ostreid Herpsesvirus, and *Francisella noatunensis* subsp. *orientalis*. The next objective of the project was to set up PCR tests for the specific pathogens at the University of Hawaii at Manoa, and to compare the test results of lethal and non-lethal methods. To achieve this objective, the literature was reviewed and the research group selected 12 primers and 6 probes that were reliable and validated. A plasmid model was constructed containing the six target sequences to be used as a positive control for absolute quantification. Reagents and solutions were purchased to start the pathogen detection work. To conduct surveillance of imported fish and oysters for pathogen presence, markets around Oahu were surveyed in February and March but no collections were made at the time due to possible budget restraints. The COVID-19 pandemic has further delayed purchasing due to markets closing. A primary challenge to this project has been the closing of markets and some farms to outside personnel to acquire samples due to the COVID-19 pandemic. As restrictions are relaxed, the research group has been able to receive collections from the farms. Additionally, PCR positive controls for some pathogens have been on hold until outside university laboratories open up again. A full report on the status of this project will be shared later this year.

AquaClip: BAP releases new feed

mill standard

The Global Aquaculture Alliance released the **Issue 3.0 of its Best Aquaculture Practices (BAP) Feed Mill Standard**. This standard has been strengthened to reflect the growing reliance of aquaculture on responsibly produced feed. Expectations continue to rise for accountability in the sourcing of marine and terrestrial ingredients, and this is reflected in ever stricter sourcing requirements.

BAP-certified feed mills are also being called on to play their part in combatting antimicrobial resistance by excluding the use of antibiotics designated by the World Health Organization (WHO) as critically important for human medicine. In addition, the BAP criteria for safe feed production have been enhanced and the social accountability requirements have been expanded to provide even greater assurance against child labor as well as forced and bonded labor. There are also new requirements that relate to the sourcing of certified soy ingredients and palm oil. These will help bolster certification programs for terrestrial ingredients, such as ProTerra, Round Table on Responsible Soy (RTRS), U.S. Soy Sustainability Assurance Protocol (SSAP) and Roundtable on Sustainable Palm Oil (RSPO), so the aquafeed industry can have a disproportionate and positive impact on sustainable food chains.

However, the greatest impact of the BAP Feed Mill Standard will come via its support for responsibly-sourced marine ingredients because aquafeed standards can help incentivize responsible fishery management. The new BAP standard bakes in requirements for responsible ingredients such as those certified to the MarinTrust standard. MarinTrust, which has just gained full ISEAL recognition, has set a goal of getting 75% of global marine ingredients, certified, in assessment or in FIPs by 2025. Reflecting this level of ambition, the new BAP Feed Mill Standard also requires a minimum of 75% of marine ingredients to be from certified sources, or FIPs, from 2025, thus raising its current 50% bar. This 75% target immediately applies to the producers of feeds for salmonids who continue to play a leading role in this arena. Any uncertified marine ingredients must, at a minimum, be free from IUU (illegal, unreported and unregulated) material. The industry for new and alternative feed ingredients is becoming increasingly important in supporting the expansion of global aquaculture. The BAP program, through its farm standards and their requirements for maximum FIFO (fish in, fish out) ratios, incentivizes the inclusion of new and alternative ingredients and the efficient usage of marine ingredients.

"The seafood marketplace continues to call for comprehensive supply chain assurances and we are charged with responding. BAP-certified feed mills are central to delivering the quantities of four-star BAP product demanded by the retail and foodservice sectors, so we are delighted to launch this new standard," said BAP standards coordinator, Dan Lee.

Source: Aquafeed.com / **Read Full Article**

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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 2016-38500-25751 and 2018-38500-28886. 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 of Hawaii Pacific University and the University of Hawaii.

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