



Regional e-Notes ~ Volume 12, Issue 7 ~ July 2020

Letter from the Director

Aloha,

"Show your gratitude to everything you encounter." This is one of my life mottos, and once again, I would like to express my appreciation to our IAC/TC members who attended our annual meeting-which was virtual for the first time in our program history-and promptly submitted their pre-proposal ranking sheets after the meeting. With the recommendations and voting provided by our devoted Industry Advisory Council (IAC) and Technical Committee (TC) members on June 29, CTSA has now taken the next step to invite those pre-proposals that received 51% or more votes to prepare and submit full proposals. The full proposals are due next month, at which point they will undergo rigorous internal and external review before consideration for inclusion in the CTSA FY2020 Plan of Work. We will keep you posted as we progress.



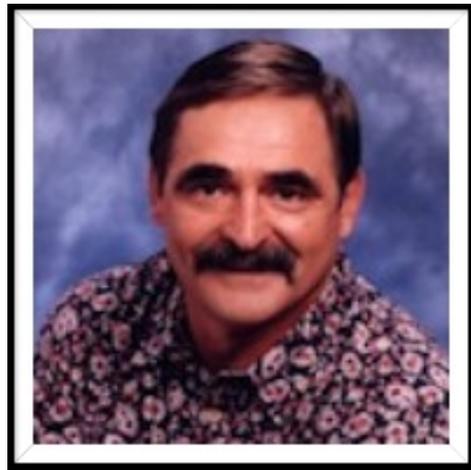
I also would like to extend my appreciation to all PI's who take the time to share their ideas on how we can sustainably develop the regional aquaculture industry. It is my unfortunate task to tell some of them that their pre-proposals were not selected by our council members to move to the next level. It is a process that I do not take lightly. I do my best to share my thoughts on the reasons why each pre-proposal was not selected by the IAC and TC based on the complex content of their discussion during the meeting. This is difficult to do, and I hope the information will help those who wish to resubmit their pre-proposals to CTSA next year; in fact, we strongly encourage any PI who was not successful during this development cycle to revise/improve their project idea based on the comments provided and apply during a future cycle. The CTSA administrative staff is happy to discuss with you if you wish.

On a separate but similar note, it is looking like funding and support for aquaculture will grow in the coming years. I noticed while watching the recent Honolulu Mayoral debate that several candidates are considering aquaculture as an important part of economic recovery, especially in the face of the devastating local economic impacts from Covid 19. This is true in other coastal locations across the U.S., which are also looking to utilize plentiful marine resources to increase food security and economic opportunities. CTSA stands committed to facilitating... [Read More](#)

Aloha to Dr. Paul Beinfang

Dr. Paul Bienfang, a biological oceanographer, passed away on June 17, 2020, in Honolulu. He will be dearly missed by his colleagues in the oceanography, aquaculture, and fisheries fields, and CTSA would like to honor his great work and legacy by sharing the following sentiments and memories.

Among his many accolades, Paul served on the CTSA Board of Directors for over ten years (1986-1997), representing Oceanic Institute (OI) during his tenure there. He completed his undergraduate and graduate degrees at the University of Hawaii (UH), and received his Ph.D. in Biological Oceanography in 1977. He joined OI in 1975 as a Senior Research Scientist, and his research in the late 70's was concentrated on the sinking rate of phytoplankton. Upon his elevation to Senior Vice President at OI in 1982 --when he oversaw a wide-ranging research portfolio in aquaculture, fisheries and oceanography-- aquaculture became an important part of his diverse and distinguished career. In 1997, Paul left OI for an aquaculture start up, Ceatech USA Inc. on Kauai. The company wanted to farm marine shrimp using the intensive farming technology developed by OI; he advised the initial design and development of the company, and continually offered strategic advice through multiple changes of ownership. Paul returned to academia in 2004, becoming Oceanography faculty at his alma mater UH.



CTSA Executive Director Cheng-Sheng Lee has been reflecting on Paul's years of service to the industries, passions and people he loved: "I traveled with Paul to many countries to visit different research institutions and attend business meetings, and he always showed critical thinking and a logical approach to any issue we encountered. I really liked his practical way of thinking. I recall one time when we talked about buying a car; he quickly remarked that if the purpose of a car was for transportation, the reliability should be the focus, not the appearance. He gave good advice to research colleagues and was well respected by the research community. He will be missed by many."

As an active member of the Hawaii Aquaculture and Aquaponics Association (HAAA), and having served on its board, Paul was a valued colleague and important advocate for aquaculture farmers and industry stakeholders throughout the region.

Outside of his academic and career achievements, Paul enjoyed spending time with his family, feng shui, golfing, science, the art of cooking and the art of friendship, according to his secretary Rose Marie Norton. "He was an indelible friend to me," expressed Ms. Norton. "Through him, all my other friendships are measured and strengthened. His spirit is generous and survives death."

Ms. Norton also shared with us the quote he kept on his computer screen: "Courage doesn't always roar. Courage is the quiet voice at the end of the day saying, 'I will try again tomorrow.'" (Mary Ann Radmacher). Though Paul sometimes 'roared' on behalf of his passions when necessary, this is a fitting quote to describe his approach to life and making the world a better place.

CTSA Project Update Polychaete Culture in Hawaii: A Potentially Valuable Feed for Shrimp Hatcheries

by Dustin Moss, Oceanic Institute of Hawaii Pacific University

Captive reproduction of penaeid shrimp requires conditioning and maturation of broodstock to stimulate gonadal development and induce mating, spawning, and ultimately the hatching of eggs to produce viable larvae. Broodstock diet is significant in the maturation process, especially in stimulating ovarian development in females. Most hatchery managers feed broodstock a mixed diet of raw, wet feeds such as squid, marine polychaetes, Artemia biomass, and shellfish, as well



as formulated feeds. Polychaetes from several genera are a common component of maturation diets (used by 66% of respondents in a survey by Global Aquaculture Alliance). Popularity of polychaetes is related to their high concentrations of specific fatty acids. Because penaeid shrimp have a limited ability to synthesize the n-6 and n-3 families of fatty acids de novo, including polyunsaturated linoleic and linolenic acids, or to elongate and de-saturate these into highly unsaturated fatty acids (HUFAs) such as arachidonic, eicosapentanoic, and docosahexanoic acids, high concentrations of these important HUFAs found in the ovaries of female broodstock have been attributed to the dietary intake of HUFA-rich items, such as marine polychaete worms. It should be noted that pelleted shrimp feeds do not contain high levels of HUFAs, nor do female shrimp readily develop mature ovaries/oocytes when fed pelleted diets.

Hawaii is a leader in the genetic improvement of penaeid shrimp and a major source of broodstock to farms locally and around the world. Currently, ~400,000 shrimp broodstock are sold by Hawaii-based breeding companies each year with an export value of ~US\$20 million. To support breeding activities, extensive captive reproduction is needed. It is estimated (based on usage of polychaetes at OI extrapolated to the entire industry) that >10,000 kg of frozen marine polychaetes are imported into Hawaii annually to support shrimp breeding/hatchery activities (cost >\$400,000 per year). The primary sources are wild-caught *Glycera dibranchiata* from the Northeast coast of the US (~\$50/kg including freight) and cultured polychaetes (*Nereis virens*) imported from Europe (cost ~\$33/kg). Major shrimp farms in Asia and Central America typically use live, wild-caught and/or cultured, local polychaetes. These worms are much cheaper (less than \$10/kg), but are not a viable alternative to imported, frozen worms for Hawaii shrimp hatcheries due to biosecurity risks (bacterial and viral pathogens).

Researchers at Oceanic Institute of Hawaii Pacific University (OI), with support from CTSA, have collected and evaluated several local polychaete species for their aquaculture potential and use as a shrimp maturation feed, including *Marphysa sanguinea*, *Lumbrineris japonica*, *Sabellastarte spectabilis*, *Malacoceros indicus*, and *Chaetopterus variopedatus*. *M. sanguinea* (Fig. 1) was selected as the primary culture candidate based on its large size (up to 25 cm), high survival in culture, high palatability to shrimp broodstock, and excellent biochemical composition. OI has established a large breeding population of *M. sanguinea* and the population has tested negative for all known shrimp pathogens since the original founders were collected in 2013.

Results of the evaluation thus far have found that *M. sanguinea* is an excellent culture candidate (for use as a shrimp broodstock feed) based on its large size (up to 25 cm), high palatability to *P. vannamei* broodstock, high survival in culture, and its acceptable to excellent biochemical composition (with regards to shrimp nutrition/maturation). Of particular note, results from investigation into the impact on reproductive output of shrimp clearly show that females fed live *M. sanguinea* far outperform females fed frozen, culture *N. virens*. The reproductive superiority of females fed live *M. sanguinea* is supported by the fact that the females also grew faster than females fed frozen *N. virens*. It is unclear whether the positive effects of live *M. sanguinea* are simply due to the worms being live and/or if there are inherent differences in nutritional quality between *M. sanguinea* and *N. virens*.

Basic culture techniques have been developed and commercial scale culture of *M. sanguinea* has been demonstrated. In addition, female shrimp broodstock fed these worms have superior reproductive output compared females fed imported, frozen polychaete worms. Importantly, these results support the continued research and development needed to make *M. sanguinea* farming in Hawaii a reality. The availability of live, local worms could reduce or (hopefully) eliminate the need to import polychaetes by offering a superior product at a potentially lower price (freight charges can be >30% of imported worm costs).

A detailed summary of experimental design and findings to date including tables and graphics is presented in the full article on the CTSA website... [Click to Read Full Article](#)

Announcements & Requests for Industry Feedback

[Public Comments Sought on](#)

New BAP Farm Standard

Issue 3.0 of the Best Aquaculture Practices (BAP) Farm Standard has been released and is available for public comments. Anyone desiring to submit a comment must do so by September 26, 2020.



The renamed BAP Farm Standard replaces Issue 2.4 of the BAP Finfish and Crustacean Farm Standard Standard, released on May 23, 2017. Issue 3.0 includes new requirements on environmental monitoring approaches for recirculating aquaculture systems, new requirements for coastal flow-through systems, requirements for efficient use of key feed ingredients, and new limits set for the BAP Fish-In Fish-Out (FIFO) ratios for many species.

[Click here for additional information and to to submit comments.](#)

Comments Sought on Revised Draft Guidance on New Animal Drugs

The FDA's Center for Veterinary Medicine released revised draft Guidance for Industry #61, entitled "Special Considerations, Incentives, and Programs to Support the Approval of New Animal Drugs for Minor Uses and for Minor Species," in order to better facilitate the availability of safe and effective new animal drugs for minor uses and minor species (MUMS).



Revised draft GFI #61 replaces a previous version, entitled "FDA Approval of New Animal Drugs for MUMS." The revised draft guidance is a thorough revision and reorganization in chronological "guidebook" fashion intended to be helpful to all sponsors, but especially for those new to the process. The revision also highlights special considerations for drugs for aquaculture.

The public comment period for dGFI #61 will be open for 120 days, starting Wednesday, July 15, 2020. Comments will be accepted at any time but should be submitted no later than Thursday, November 12, 2020, to ensure that the FDA takes the information into consideration before making further decisions on this issue.

To electronically submit comments to the docket, visit www.regulations.gov and type FDA-1997-D-0444 in the search box. For assistance in submitting electronic comments, please see regulations.gov help.

Comments Sought on Scientific Report of the 2020 Dietary Guidelines Advisory Committee

The 2020 Dietary Guidelines Advisory Committee has completed their review of the evidence on nutrition and health, and their Scientific Report is now available online. The final report reflects the Advisory Committee's full examination of the evidence using three rigorous approaches: data analysis, systematic reviews, and food pattern modeling. The Scientific Report includes their conclusions and advice to the United States Departments of Agriculture and Health and Human Services, their rationale and, finally, their recommendation for future research. All of this information will be taken into consideration by the Departments in the development of the next edition of the Dietary Guidelines for Americans. Comments must be submitted by August 13, 2020. [Click here for additional information and to submit comments.](#)



AquaClip: Innovative research to produce algae that traps greenhouse gas emissions

Researchers from the University of Maryland Center for Environmental Science (UMCES) have

been selected to receive \$3 million from U.S. Department of Energy's (DOE) Office of Fossil Energy (FE) to develop a scalable and deployable carbon-negative bioreactor system to capture carbon dioxide from power plant flue gases to produce micro algae.

The project, A Highly Efficient Microalgae-Based Carbon Sequestration System to Reduce CO₂ Emissions from Power Plant Flue Gases, will be led by Yantao Li, Feng Chen and Russell Hill of the Institute of Marine and Environmental Technology (IMET) in Baltimore. The research focuses on harnessing photosynthetic microalgae to sequester carbon dioxide from power plant flue gases. The outcome will be a scalable and deployable carbon-negative bioreactor system for carbon dioxide captured from flue gases, a modular and scalable design that will allow its expansion to be paid for by the technology itself.

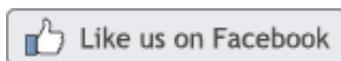
"We built on our strength in using a microalgae-based system to reduce carbon dioxide emissions on an industrial scale while producing valuable products such as biofuels and carotenoids, phytonutrients that can be used as nutritional supplements," said Yantao Li.

Researchers have identified microalgal strains that thrive when grown with flue gases released from the 3 megawatts methane-fired electric generating power plant at Baltimore's Back River Wastewater Treatment Plant. Through a bioreactor process, the algae can sequester the carbon dioxide and reduce sulfur oxide and nitrogen oxide emissions, combustion gases that contribute to global warming.

The research goal of DOE's Carbon Utilization Program is to reduce emissions and transform waste carbon streams into value-added products.

Source: Aquafeed.com / [Read Original Article](#)

www.ctsa.org



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 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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