

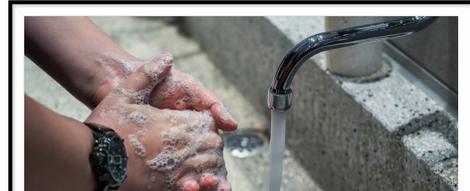


*Regional e-Notes ~ Volume 12, Issue 3 ~ March 2020*

## Letter from the Director

Aloha,

I hope this newsletter finds you healthy and safe. First and foremost, my staff and I are sending our best to each of you and your families, wherever you may be. We know these unprecedented times are difficult, but we will get through this together.



Earlier this week, the Honolulu mayor and Hawaii governor asked residents to stay at home until at least April 30. While the university is exempt from this order, the administrators have asked everyone to only come to the office if it is necessary. With most operations being moved online, there may be some procedural slow down; we will try our best as a program to avoid disruption. We remain ready to help our researchers and industry stakeholders as needed, starting with some of the resources shared in this month's newsletter.

All of the current 'stay-at-home' and 'shelter-in-place' orders across the country include agriculture/aquaculture as one of the top essential functions to keep society moving, reminding us of the importance of the work of our farmers and stakeholders. We extend our most sincere gratitude to you for keeping our world fed, and implore you to take increased precautions to avoid exposing yourself to illness. Should you have any concerns that you want to call to the attention of our local and/or federal government, please let us know and we will voice them on your behalf. Also, I encourage you to take the newly released National Aquaculture Association survey to assess the affects of the pandemic on aquaculture in the United States; there is more information and a link to the survey below.

The current global pandemic brings to light the importance of biosecurity, especially in industries responsible for feeding people. For the safety of consumers, we must invest in disease surveillance and mitigation. We thank the researchers in our region who work to protect us and the aquatic animals and plants we farm from outbreaks and harmful pathogens, such as those featured in this month's issue.

If you have any questions, comments or suggestions, or if you just need to talk, please reach out. In times like these, we need to be --and are-- here for each other.

Thank you and best wishes,

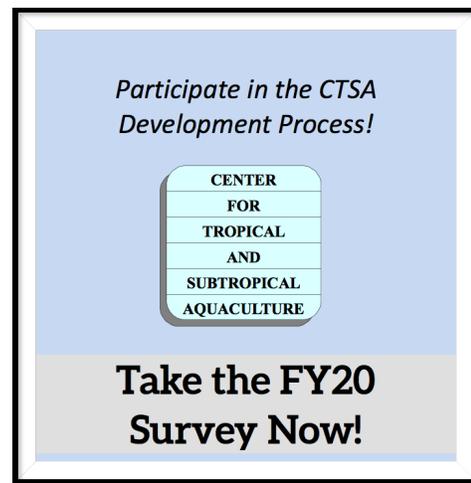
Mahalo,  
Cheng-Sheng Lee  
Executive Director, CTSA

## CTSA FY2020 Development Process

In an effort to get the most complete picture of the needs and priorities of our regional aquaculture industry, we are calling for your assistance and input!

Please take a few moments and [click here to take our FY2020 Priority Species and Areas survey](#) to help us determine the priority species and areas of focus for the FY2020 development cycle. Please email Meredith Brooks at [mbrooks@ctsa.org](mailto:mbrooks@ctsa.org) with any questions or other suggestions.

We will release the FY2020 Request for Pre-Proposals in May 2020, and will be developing the priority areas until that time with input from our Industry Advisory Council, Technical Committee, Board of Directors, and stakeholders like you!



## Participate in NAA National COVID-19 Impact Survey

The National Aquaculture Association requests that the US aquaculture community (farms and allied businesses) participate in a 15-minute survey developed by Virginia Tech and The Ohio State universities to assess the direct and indirect effects of coronavirus disease (COVID-19) on US aquaculture and to gather input on types of assistance that will be most useful. The results will be shared nationally to assist farms, allied businesses and trade associations in communicating the impacts of COVID-19 to public and private decision makers.

The purpose of this survey is to quantify the effects of coronavirus disease (COVID-19) on commercial aquaculture, aquaponics or allied businesses. This survey will be distributed once per quarter throughout 2020, to capture the evolving effects of coronavirus disease (COVID-19) on your farm or business.

No personally identifiable information (name, address, e-mail, telephone number, IP address, etc.) will be collected. All data from this survey will remain anonymous.

[Click here to take the survey.](#)

## CTSA Project Summary: Presence of *Oreochromis niloticus* and *Francisella noatunensis* subspecies *orientalis* (Fno) in feral populations of tilapia in Hawaii

*by Lei Yamasaki, Department of Agriculture; Thomas Y. Iwai, Island Aquaculture & Aquaponics; RuthEllen Klinger-Bowen, University of Hawaii at Manoa; David A. Weese, Georgia College & State University; Michael A. Wong, University of Hawaii at Manoa*

The Hawaii Fish and Game Division and the Federal Bureau of Commercial Fisheries (now called the National Marine Fisheries Service) introduced several species of tilapia to Hawaii for food

production, weed and pest control, and for use as live baitfish. Mozambique tilapia (*Oreochromis mossambicus*), greenhead tilapia (*O. macrochir*), redbelly tilapia (*Tilapia zillii*), redbreast tilapia (*T. rendalli*), and blackchin tilapia (*Sarotherodon melanotheron*) became established in natural bodies of water in the 1950s and 60s after intentional release or accidental escape (Brock, 1960, Szyper et al., 2000). Starting in the 1970s, a number of different species and strains of tilapia (blue tilapia (*O. aureus*), red strains and hybrids of Mozambique tilapia, and hybrids of Nile tilapia, *O. niloticus*) were introduced to Hawaii for food production (Szyper et al., 2000). In 2000, a statewide survey involving farmed and feral tilapia conducted by Szyper et al., revealed that six species and five hybrids species of tilapia were present in Hawaii. The identified fish were outperformed in terms of growth when compared to Nile tilapia, and poor genetic stocks were seen as the limiting factor for Hawaii's tilapia industry (Szyper et al., 2000). Despite the presence of the introduced species in the state, only three species (blue tilapia, Sabaki tilapia (*O. spilurus*), and Mozambique tilapia) were permitted entry for private and commercial use until 2017, when restrictions on the importation of Nile tilapia were lifted. Despite arguments that the Nile tilapia was already established in the wild, the approval process for the importation of Nile tilapia for aquaculture purposes took nearly twenty years due to environmental concerns. Nile tilapia is cultured extensively throughout the world due to its fast growth rate, high fecundity, and tolerance to a wide range of environmental conditions. However, these same attributes are what make the species invasive in environments to which it is not native (Pullin, 1998; FAO, 2010). A statewide survey was conducted to substantiate the claim that Nile tilapia were already present in feral population of tilapia throughout Hawaii.

In 1994, unexplained mortalities occurred in cultured and feral populations of tilapia on the island of Oahu (Mauel et al., 2003). The disease-causing agent was found to be a bacterium, *Francisella noatunensis* subsp. *orientalis* (*Fno*) (Mauel et al., 2003; Szyper et al., 2000). To prevent its spread, the state issued a moratorium in 1998 (PQ Policy 98-09, Section 150A-8, HRS) on moving tilapia species from Oahu to other Hawaiian Islands. In 2010, tilapia on the islands of Kauai, Oahu, Molokai, and Hawaii were tested for *Fno* by a polymerase chain reaction (PCR) assay in a study conducted by Klinger-Bowen et al. A single farmed fish on the island of Molokai tested positive for the pathogen. The results suggested that the disease was mostly confined to the island of Oahu; however, sample submissions from neighboring islands were few. It was still unclear if the moratorium prevented the spread of *Fno*. A survey was conducted to determine the pathogen's geographic range.

Feral tilapia were collected from ten sites across the islands of Oahu, Molokai, Maui, Kauai, and Hawaii between November 2017 and October 2018 (Figure 1, Table 1). From each site, twelve to thirty fish were collected via angling and cast netting. Collection sites were chosen according to historical data provide by Mr. Thomas Iwai. Once collected, tilapia were euthanized and transported on icepacks to the Hawaii Department of Agriculture Veterinary Laboratory. The fish were grossly examined for lesions, measured, weighed, and sexed. Fin clips were taken from each specimen and preserved in ethanol for species identification. Additionally, samples of spleen were collected for *Fno* detection by real-time PCR assay, culture, histology, and microscopy.

Potential species identifications based on the sequencing of the mitochondrial control region are presented in Table 1. Pure Nile, Mozambique, and blue tilapia were found in Alenaio stream on the island of Hawaii. Hybrids of Nile and Mozambique tilapia, as well as Nile and blue tilapia were found on the islands of Molokai, Maui, and Hawaii. On Oahu and Kauai, blackchin tilapia was the predominant species collected. Redbreast tilapia were identified in Kahului stream on Maui and Puali stream on Kauai.

The real-time PCR assay was able to detect *Fno* as low as 0.001 ng/ $\mu$ L of bacterial DNA. The pathogen was detected in fish collected on Oahu, Maui, and Kauai. Granulomas formed by inflammation were observed in fish spleens at three of the four sites that were positive for *Fno*. Five other sites had fish that showed granulomas (Table 2, Figure 3), but were negative for the real-time PCR assay. Possible causative agents include *Mycobacteria* and *Nocardia* species. All samples of spleen were negative for *Fno* growth on the recommended culture medium.

Nile tilapia and hybrids are present in streams on the islands of Molokai, Maui, and Hawaii. It is possible that the Nile x Mozambique tilapia hybrid is a descendant of fish introduced in the 1980s from Taiwan (Szyper et al., 2000). It is also possible that the Nile x blue tilapia hybrid found on

the island of Hawaii is the descendant of fish imported from the mainland U.S. in 1995 (Szyper et al., 2000). It is unknown when and how pure Nile tilapia was introduced to Alenaio stream. There was no documented importation of Nile tilapia into the state at the time of this study. Interestingly, Wu and Yang (2012) also identified the speceis in a stream in Hilo...[Click to Read Full Article](#)

## **AquaClip: Low-interest federal disaster loans available to small businesses, nonprofits**

The U.S. Small Business Administration announced today it is offering low-interest federal disaster loans for working capital to Hawaii small businesses and nonprofit organizations starting to feel a substantial economic pinch from the COVID-19 coronavirus outbreak.

That's good news for the many mom-and-pop businesses locally who have been forced to lay off employees, reduce hours, go to an alternative business model, or shutter indefinitely.

"SBA is strongly committed to providing the most effective and customer-focused response possible to assist Hawaii small businesses with federal disaster loans. We will be swift in our efforts to help these small businesses recover from the financial impacts of the coronavirus COVID-19," said SBA Administrator Jovita Carranza. "Small businesses, private non-profit organizations of any size, small agricultural cooperatives and small aquaculture enterprises that have been financially impacted as a direct result of ... COVID-19 since Jan. 31 ... may qualify for economic injury disaster loans of up to \$2 million to help meet financial obligations and operating expenses which could have been met had the disaster not occurred.

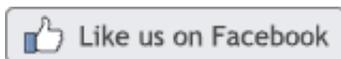
The loans became available after federal approval of a certification request submitted Tuesday by Gov. David Ige.

"Small businesses are a vital economic driver in our community, and we must do everything we can to support them as they struggle through this crisis," said Ige. "We appreciate the SBA's quick action to approve this loan program for small businesses that have been hit so hard by COVID-19 outbreak."

According to an analysis by the Department of Business, Economic Development and Tourism there are 8,302 businesses in Hawaii with 99 or fewer employees. Those businesses account for 96,189 jobs with a combined annual payroll of \$3.16 billion.

Source: Hawai'i Tribune Herald / [Read Original Article](#)

[www.ctsa.org](http://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.

202 Kalaniana'ole Highway, Waimanalo, HI 96795

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