

REGIONAL NOTES

CENTER FOR TROPICAL AND SUBTROPICAL AQUACULTURE

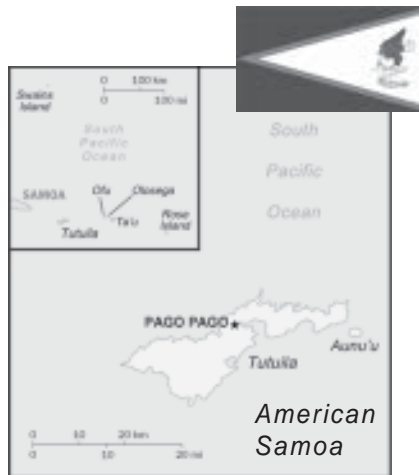
CTSA's island representatives sum up industry's status (part 2)

The following is a brief overview of aquaculture in American Samoa, the Federated States of Micronesia, and Palau. CTSA's Industry Advisory Council representatives Darren Okimoto, Andy Tafleichieg, and Theofanes Isamu provided most of the information. They all see good potential for aquaculture industry development in their island regions, and common plans include the need to obtain more funding support and strengthen local capacity building through seminars and training workshops. This overview complements the one presented earlier this year, in the *Regional Notes*' March issue, which focused on Hawaii, Guam, the Marshall Islands, and the Northern Mariana Islands.

American Samoa

Types of Aquaculture

1. **Tilapia** (Nile tilapia and a red *moss-ambicus* hybrid): Tilapia culture is probably the furthest developed type of aquaculture in American Samoa. The industry consists of about 10 to 15 small-scale backyard operations, and the farmers have their own cooperative called the Samoa Family Sunfish Cooperative.
2. **Moi**: The non-profit organization Tausala Ole Moana, which received funding from the Administration for Native Americans, is constructing a land-based facility for moi culture.
3. **Giant clams**: The non-profit organization Native Resources Developer, Inc. (NRD) is working on establishing community-based mariculture of giant clams and corals for the marine ornamental industry. NRD constructed a land-based giant clam hatchery at Alao village. The University of Hawaii Sea Grant College Program, in conjunction with NRD and the American Samoa Community College, conducted a giant clam spawning workshop on October 8–18, 2004 at the Alao hatchery. Simon Ellis of the Pohnpei-based Mid-Pacific Marine Consultants taught the workshop. He trained five local community members in giant clam, *Tridacna derasa* and *T. maxima*, spawning techniques, transferred giant clam and soft coral culture technology theory to resident Sea Grant Extension Agent Darren Okimoto, and made recommendations to refine the Alao hatchery. The Department of Marine and Wildlife Resources also has a giant clam hatchery, but its production is nominal.
4. **Freshwater prawns**: One farmer cultures prawns as a hobby.



CTSA calls
for preproposals.

See pages 4 and 5
for details.

Letter from the director



I hope all of you had wonderful Christmas and New Year's celebrations! I look forward to a prosperous and productive 2005 for everyone.

The project development process for our upcoming Year 18 funding cycle has gone fairly smoothly using our new 2004 procedures. The Board of Directors will be reviewing the Year 18 proposals on January 13, 2005.

We are also making improvements in other areas. At the special joint session of the Industry Advisory Council and Technical Committee in October, members made suggestions on how to make meetings more efficient. CTSA will move toward using e-mail or the Web to shorten the time required of members at meetings.

Principal investigators turned in their progress reports last month, and project industry liaisons and I have been reviewing these reports. Pertinent information and results will be shared with the Board of Directors at their January meeting.

Cheng-Sheng Lee



REGIONAL NOTES is published four times per year by the Center for Tropical and Subtropical Aquaculture under a grant from the U.S. Department of Agriculture Cooperative State Research, Education, and Extension Service.



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AQUACLIPS

Hawaii company to export breeding shrimp to Southeast Asia

Pacific Business News, Tuesday, October 5, 2004

Kona Bay Marine Resources Inc., a Hawaii-based marine biotechnology company, has gotten a license to export shrimp broodstock to Thailand, the largest shrimp producer in the world. It is one of only three licenses in the world that Thailand has granted, Kona Bay Marine said Monday. To meet the demand, the company has increased its capacity 50 percent and plans to double that next year. "This is validation that Hawaii now has the first global agricultural brand since Kona coffee," said CEO Brian Goldstein. "It validates our strategy to become the leading shrimp broodstock exporter in the world."

Offshore fish farm financed

By Travis Loop, West Hawaii Today, Sunday, October 24, 2004

Ancient Hawaiian fishponds supplied a constant source of fish and prevented overfishing. Raising fish in open-ocean cages could be considered a modern-day equivalent, and now a \$4 million investment in Kona Blue Water Farms, LLC will fund offshore harvesting of kahala, a fish used for sashimi and fillets in Pacific Rim dishes. "Open-ocean fish farming has huge potential in Kona and the rest of the world," said Neil Anthony Sims, KBWF's interim CEO and president. "It's better for the environment, it makes economic sense and it results in healthier, higher quality fish." Cornerstone Holdings, a company based in Aspen, Colorado, invested in open-ocean fish farming off the Kona coast because KBWF qualified as a high-technology business under Act 221, a Hawaii law providing companies that invest in high-technology businesses in the state with 100 percent tax credit up to \$2 million over five years. "Act 221 spurred the initial interest in our company and allowed us to attract the right partners to achieve our goals," Sims said. KBWF would lease 81 acres of ocean located 2,000 feet offshore of Unualoha Point, north of Kona International Airport. Kahala would be submerged 200 feet underwater. Farm operations will be based at Honokohau Harbor, and a workboat will service the farm for feeding, grading, and harvesting.

Taiwan to test fishery in Marshalls

By Giff Johnson, Marianas Variety, Monday, October 25, 2004

MAJURO, Marshall Islands—The Taiwan government plans to support a pilot fisheries project in the Marshall Islands as a follow-up to a sustainable fisheries and aquaculture conference held in Majuro last month. Dr. Poi-po Lee, deputy director of Taiwan's International Cooperation and Development Fund, said Friday that Taiwan will send a team of experts to the Marshall Islands for a two-to-three-week exploratory visit to identify a fisheries area that is appropriate for a pilot project. The Marshall Islands and Taiwan established diplomatic ties in 1998. Possibilities for a pilot fisheries project include a hatchery for growing fish to restore stocks, Lee said. A team from the ICDF will come to the Marshalls early next year to do a detailed assessment in consultation with local fisheries officials, he said. "If we get good results from the pilot project, we can transfer it to a local enterprise to take over," he said.

Shrimp farms get boost

By Jan TenBruggencate, Honolulu Advertiser, Wednesday, December 15, 2004

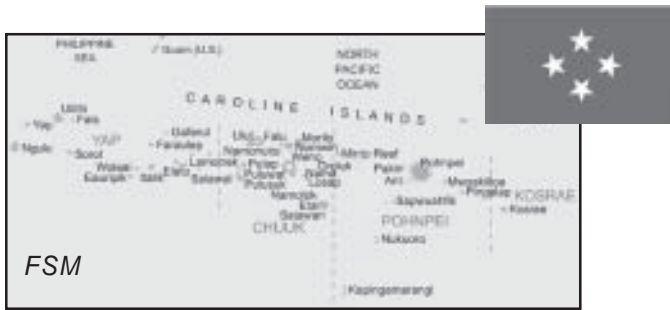
Hawaii's high-tech shrimp farming industry hopes for a marketing boost from a new designation of U.S.-farmed shrimp as an environmentally friendly product. The group Environmental Defense, as part of its Oceans Alive program, has listed domestic shrimp as an "Eco-Best" seafood selection. The designation is an indication that products are produced in an environmentally appropriate way and that they are low in hazardous contaminants when consumed.

Industry's status continued from page 1

Future Prospects

In addition to encouraging and supporting local capacity building, Sea Grant is looking at developing a low-cost aquatic feed using local food products and by-products.

Federated States of Micronesia



Types of Aquaculture

1. **Trochus and giant clams:** Trochus shells are harvested each year as a commercial commodity, and populations are established in all four FSM states. There are sanctuaries and limited open seasons, but more active countermeasures are needed to achieve higher production levels, such as propagation by releasing seeds. Giant clams are nearing extinction in many parts of the islands. Government ventures have mainly been geared toward reseeding and transplanting giant clams and trochus. The Pohnpei Office of Marine and Coastal Resource Management operated an aquaculture facility for trochus culture, but a typhoon destroyed it in 1994. A joint project between the national government, state government, and the government of Japan completed the restoration of the facility in 2002, and it is now in full operation.
2. **Milkfish:** Pohnpei has one privately owned milkfish farm, which was established some time ago mainly to supply the longline fishing industry with bait fish.
3. **Black-lip pearl oysters:** Most of the activity is in Pohnpei state, which has three black-lip pearl oyster demonstration grow-out farms. Project funding, which supports these farms, comes from the College of Micronesia Land Grant Program, the U.S. Department of Interior, and Hatch funds. This year there were two Pohnpei pearl industry development meetings, which brought the business community and government officials together to discuss the development of a successful pearl industry in Pohnpei. There is also a community-run project,

Nukuoro Black Pearls, on Nukuoro Atoll, which is doing well. The next harvest is expected to yield approximately 8,000 pearls. It plans to become a non-profit corporation, which will feed profits back into the community. Chuuk (Truk) also has its own pearl hatchery station, but there is limited information about it.

4. **Sponges:** CTSA has provided much of the initial support in this area in the 1990s. There are ten farms in operation, but the annual production is only about 3,000 to 4,000 sponges. Cultured sponges are now available in some local markets in the FSM and are shipped to overseas vendors on a small-scale basis. The University of Hawaii at Hilo provides some funding to support a sponge extension agent.

Future Prospects

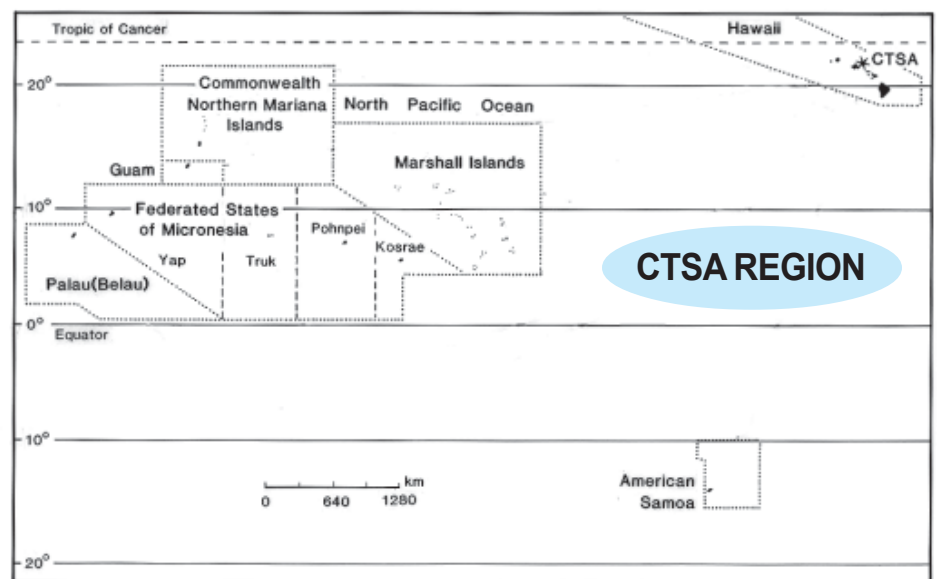
Each of the four FSM states has its own priority plans for aquaculture development; however, they lack long-term aquaculture development plans. The FSM established a national aquaculture center in Kosrae that is focused on hatchery production and grow-out of giant clams. It is envisioned that local farmers, who have been recruited and trained, will buy broodstock clams from the center to be resold or eaten. The center would then diversify to other marine ornamental and food species. It is critical for the center to provide fully integrated services from seedstock production to farmer training.

Palau

Types of Aquaculture

1. **Giant clams (*Tridacna derasa* and *Tridacna gigas*):** In the 20 clam farms in Palau, there are about 600,000 clams in the land-based farms and 1.6 million in the ocean-based farms.

Continued on page 7



**CENTER
FOR
TROPICAL
AND
SUBTROPICAL
AQUACULTURE**

CTSA currently assists aquaculture development in the following region:

Hawaii
American Samoa
Northern Mariana Islands
Federated States of
Micronesia
Guam
Palau
Marshall Islands



REQUEST FOR PREPROPOSALS

Due February 28, 2005

The Industry Advisory Council (IAC) and the Technical Committee (TC) of the Center for Tropical and Subtropical Aquaculture (CTSA) met on October 5 and 6, 2004, to advise CTSA on the areas of research CTSA should fund in order to achieve its mission. **CTSA is requesting preproposals to address these priority areas for its Year 19 funding cycle.** (Projects approved for Year 19 will likely begin in the Fall of 2006.) Please submit your preproposals to the CTSA administrative office by **Monday, February 28, 2005.**



CTSA's mission is to support aquaculture research, development, and demonstration and extension education to enhance viable and profitable U.S. aquaculture. CTSA is funded by an annual grant from the USDA's Cooperative State Research, Education, and Extension Service. **CTSA would like to fund projects that will enhance economic opportunities for aquaculture producers in our region. Inter-agency cooperation and shared funding of priority projects is strongly encouraged.**

- **Eligible Applicants:** Execution of the project must be led by universities, community colleges, or non-profit research institutions and organizations. Projects may not be initiated directly with private individuals or commercial companies.
- **Preproposal Guidelines:** Preproposals should be no more than two pages (single-spaced, 10 to 12 pt. font) and include the following:

Proposed title or main idea

Problem statement

Briefly explain the need for the project, which should address the priority species and constraints as identified by the IAC and TC (see next page).

Proposed objectives

Define and number objectives that are achievable and measurable. Please visit the CTSA Web site at www.ctsa.org to view previously funded projects so that your preproposal does not duplicate work already done or being done by other projects.

Approach

Describe the procedures and facilities that will be used to accomplish the objectives.

Duration

If the duration is more than one year, then the objectives and approach for each year must be included.

Estimated budget

Estimate the funding needed to accomplish the objectives. Provide the estimates in dollars per year. CTSA typically does not fund projects for over \$100,000 per year. Preference is given to projects that will deliver the most benefits at the lowest cost. Due to CTSA's limited project budget (~\$560,000), funding will be distributed to the highest ranked proposals until all of the available funds have been exhausted.

CTSA Request for Preproposals continued

Suggested project work group members

List individuals by name and affiliation who would be able to carry out the objectives. Project work groups should involve participation by individuals with different areas of expertise. When possible, these individuals should be from different political entities or institutions within the region.

Please e-mail preproposals to dsasaki@hawaii.edu. If you have any questions, please contact Debbie Sasaki via e-mail or by telephone at (808) 956-3386. If necessary, preproposals may be faxed (808-956-5966) or mailed to:

The Center for Tropical and Subtropical Aquaculture
University of Hawaii at Manoa
3050 Maile Way, Gilmore Hall 213A
Honolulu HI 96822-2231

• Top Ten Species and their Constraints by Region as Identified by the IAC and TC

Hawaii

1. Yellow tang
broodstock maturation, fertility
first feeding
2. Shrimp (cleaner and snapping)
reproduction
3. Kahala
broodstock conditioning
ectoparasites
4. Corydoras
mass production
5. Moi
operculum deformity
selective breeding
6. Tuna
scale of work
government regulations
7. Sturgeon
seedstock transportation
spawning synchronization
8. Live rock
lack of information
biology and culture of coralline algae
9. Swordtail
scale-up, quality of control
lyretail production, gene marker
10. Grouper
niche market
lack of local technology

Hawaii's general constraints

high costs of land, labor, and energy
biological constraints
(seedstock limitations)
biosecurity/biocontainment

U.S.-affiliated Pacific islands (USAPI)

1. Pearl oysters
nursery survival and predation
spat transport
grafting technology
economics—data, modeling
2. Tilapia
value adding
optimal stocking density
3. Grouper
first feeding and feeds
4. Mangrove crabs
5. Corals (soft and hard)
reproduction and fragmentation
techniques
land-based parameters, techniques
6. Moi
7. Sponges*
pharmaceutically active, alternative
species
transport, introductions
8. Shrimp*
disease
9. Milkfish*
10. Giant clams*

USAPI constraints applicable to all species

extension seedstock availability capacity
biosecurity policy, regulation biocontainment
marketing economic feasibility energy efficiency

* IAC and TC members did not necessarily think CTSA needs to fund work on sponges, shrimp, milkfish, or giant clams right now but selected them because they are important to the region.

Cook Up a Feast for the Holidays with Local Aquacultured Products



The Oceanic Institute Shrimp Program's Favorite Hawaiian BBQ Shrimp Recipe

Past and present Oceanic Institute shrimp program employees vouch for the following shrimp recipe. It is a modification of a recipe from an old MidWeek column by Hari Kojima, longtime host of the local T.V. show "Let's Go Fishing."

2 pounds fresh or frozen shrimp, preferably aquacultured Pacific white shrimp

1. Chop heads and legs off of shrimp
2. Cut shrimp from back and remove gut
3. Butterfly shrimp (leave the shell on) and lay flat
4. Turn shrimp over and score horizontally with a knife to prevent it from curling while cooking
5. Pat shrimp dry with paper towels
6. Marinate in sauce overnight

Sauce (adjust to taste)

- 1 cup mayonnaise
- 1 Tbsp oyster sauce
- ½ cup sugar
- 1 Tbsp rice wine vinegar
- 1 Tbsp mirin or sake
- 1 Tbsp lemon or lime juice
- 1 tsp black pepper
- 2 tsp Hawaiian salt
- 1 Tbsp green onions, chopped
- 1 Tbsp cilantro, chopped
- 1 Tbsp garlic, chopped
- 1 tsp Japanese seven spice seasoning (shichimi togarashi) or 1 tsp chopped Hawaiian chili peppers or dash of Tabasco sauce, Sriracha hot sauce, or other hot sauce
- 1 tsp paprika or cumin (optional)
- 1 tsp ginger, minced (optional)

Place shrimp on a hot grill, with the shell side down. Do not turn over. Shrimp are done when the shell becomes slightly burnt and the sauce starts to bubble and caramelize. Do not overcook.



Laura Laumatia's Fish Oka Recipe



American Samoa Extension Agent Darren Okimoto raves about this recipe. Oka is a Samoan dish of raw fish (or other seafood) and coconut milk.

- 4 pounds of raw fish such as aquacultured tilapia, kahala, or moi or wildcaught ahi, mahimahi, or ono
- 2–3 lemons or 4–5 limes
- 4 tomatoes, diced
- 2 cucumbers, diced
- 1 small onion or 1 bunch of spring onions, diced
- 5–6 small chilis, diced
- Coconut cream (3 coconuts' worth, preferably fresh)

1. Cut fish into bite-sized chunks and place in a mixing bowl
2. Squeeze lemons or limes to make juice, and pour the juice onto the fish—just enough to soak all of the fish chunks
3. Soak for at least 4 hours, preferably overnight in the refrigerator
4. Add diced vegetables and coconut cream, stir, and serve

Best when served with cold Vailima (Samoan beer).

Yellow Gingered Catfish

This recipe was given out by the Guam Cooperative Extension Service.

- 2–3 pounds aquacultured catfish
- 1 medium sized yellow onion, chopped
- 4 cloves garlic, chopped
- 1 tsp black pepper
- 1 tsp salt
- 2 cups coconut milk
- ¼ cup vinegar
- 10 slices of yellow ginger



1. Cut fish into bite-sized pieces
2. Put fish in a pot with all of the ingredients except for the coconut milk and ginger
3. Bring mixture to a boil and then reduce to medium heat until fish is cooked
4. Mix in ginger, stirring lightly to avoid breaking the fish
5. Pour in coconut milk, bring to a boil, and then remove immediately
6. Serve hot with rice

CTSA's PRAISE project survives Halloween Eve flood



PRAISE

<http://library.kcc.hawaii.edu/praise/>

CTSA's Pacific Regional Aquaculture Information Service for Education (PRAISE) project, which is based at the University of Hawaii's Hamilton Library, survived a catastrophic flash flood that hit the Manoa neighborhood on October 30, 2004. According to UH officials, estimates of the damage to the university could be as high as \$100 million.

Hamilton library was one of the hardest hit buildings of the 30 buildings on

campus damaged by the flood. The flood devastated the library's basement, in particular, where it tore down walls, knocked out the entire computer room, and ruined countless collections of maps, photographs, and other archival documents.

After being offline for a week following the flood, the PRAISE Web site returned online, and full services were soon resumed. PRAISE offers free and efficient document delivery services, which give farmers and researchers valuable access to aquaculture information they would not otherwise have.

Although the flood destroyed the PRAISE server, the Web site is currently being run off of an alternate site until the

project can purchase another server. PRAISE project principal investigator Kristen Anderson and her assistant Lois Kiehl-Cain are filling requests for documents but explained that there may be a slight delay in the turnaround time. Electricity to the library has not yet been restored, and they have to use flashlights to find the journals. Anderson and Kiehl-Cain have also been heavily involved in the monumental salvage and clean-up operation. 🐼



Sign Up!

Pacific Aquaculture Listserv

<https://listserv.hawaii.edu/archives/pacificaquaculture-l.html>

"Discussion list for those interested in aquaculture in the Pacific region." 🐼🐼🐼🐼

Sign Up!

Industry's status continued from page 3

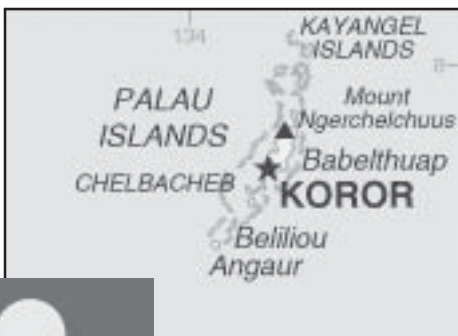
- Milkfish** (*Chanos chanos*): Palau has three milkfish project sites. Production at the Peleliu natural milkfish pond is about 1 ton per year, but they do not sell the fish. The fish are distributed to the community.
- Grouper** (coral grouper, *Plectropomus laevis* and marbled grouper, *Epineph-*

elus polyphkadion): Researchers have been working on coral grouper larval rearing but have only been able to keep the fish alive for 72 days. Work is also being done to mass-produce marbled groupers.

- Black-lip pearl oysters:** A Japanese pearl oyster expert is volunteering his time to assist with pearl oyster aquaculture development.

Future Prospects

The main objectives are to increase exports and develop environmentally friendly aquaculture for job creation and opportunities. It is important to sufficiently develop an aquaculture industry by 2008 because the compact of free association with the U.S. will end in 2009. 🐼



UPDATE

CTSA's Board of Directors to re-view Year 18 proposals

CTSA's Board of Directors will meet on Thursday, January 13 to review the proposals submitted for CTSA's Year 18 funding cycle. This is the last step before the proposals are sent to the USDA/CSREES for final approval.

CTSA to publish 2004 Annual Accomplishment Report

CTSA's 2004 Annual Accomplishment Report will be completed in January 2005. It will be submitted to the USDA/CSREES, distributed to members, and posted on the CTSA Web site. The report is a compilation of progress reports from the 21 projects that were active in 2004.

CENTER FOR TROPICAL AND SUBTROPICAL AQUACULTURE

The Center for Tropical and Subtropical Aquaculture (CTSA) is one of five regional aquaculture centers in the United States established by Congress in 1986 to support research, development, and demonstration and extension education to enhance viable and profitable U.S. aquaculture. Funded by an annual grant from the U.S. Department of Agriculture's Cooperative State Research, Education, and Extension Service (USDA/CSREES), the centers integrate individual and institutional expertise and resources in support of commercial aquaculture development.

CTSA currently assists aquaculture development in the region that includes Hawaii and the U.S.-affiliated Pacific islands (American Samoa, Commonwealth of the Northern Mariana Islands, Federated States of Micronesia, Guam, Republic of Palau, and the Republic of the Marshall Islands.)

In its seventeen years of operation, CTSA has distributed over \$9 million to fund more than 177 projects addressing a variety of

national aquaculture priorities.

Each year, the Center works closely with industry representatives to identify priorities that reflect the needs of the aquaculture industry. After consultation with appropriate technical experts, CTSA responds with a program of directed research with objectives that focus on these industry priorities. A Board of Directors is responsible for overseeing the programmatic functions of CTSA. Results of CTSA projects are disseminated through its print publications, hands-on training workshops, and Web site.

CTSA is jointly administered by The Oceanic Institute and the University of Hawaii. Its main office is located at The Oceanic Institute's Makapuu Point site on the island of Oahu in Hawaii.

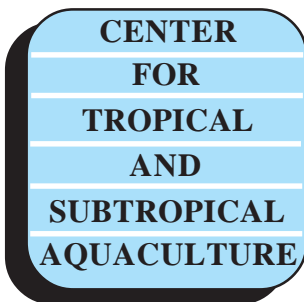
For further information, contact Cheng-Sheng Lee, Ph.D., Director, by telephone

(808-259-3107), fax (808-259-8395) or e-mail (cslee@oceanicinstitute.org).

FAST FACT

"The value of Hawaii grown aquaculture totaled \$27.7 million in 2003, up 10 percent from 2002."

--Hawaii Agricultural Statistics Service



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