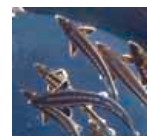




Aquaculture on Maui

Aquaculture Extension Specialist: Robert D. Howerton



Introduction

The University of Hawai'i Sea Grant College Program in Maui County works to establish an economically viable aquaculture industry, develop aquaculture education and public education and outreach, and support continued diversification of aquaculture activities.

Supporting the development and expansion of aquaculture is consistent with the county's long-term strategy for economic diversification through fostering environmentally compatible and socially acceptable industries. Maui County has an ideal environment for aquaculture with excellent water quality, unique markets, and skilled aquaculturists, researchers and technicians.

Diversifying the number of species cultured in Maui County will promote industry expansion by supplying niche markets with new food fish and invertebrate species.

Important components include developing an industry sector that produces ornamental aquarium fish and plant species, and providing a forum for new research and development initiatives

The feasibility of developing a Maui County-sponsored aquaculture park will also be investigated. Maui County has two agriculture parks that were established approximately seven years ago. Agriculture farmers lease acreage long term at reasonable rates and the proposed aquaculture park would follow the guidelines established and be modeled after the agriculture facility.

1999-2003 Sea Grant Funding

UH Sea Grant: \$67,917; matching funds: \$430,689

Activities

Traditional Hawaiian Fishpond Restoration Project Loko I'a activities promote innovative aquaculture techniques, research and education in aquaculture, and resource sustainability through the traditional Hawaiian concept of the ahupua'a.

The Fisheries Assessment Project in Keālia Pond National Wildlife Refuge will assess fish populations, including species distribution and abundance, and determine dietary habits of fish species and sources of fish recruitment.



Sturgeon Culture in Hawai'i for the Center for Tropical and Subtropical Aquaculture

H. Takata

The Center for Tropical and Subtropical Aquaculture (CTSA) Sturgeon Culture in Hawai'i project will establish alternative food fish species, develop hatchery protocol for sturgeon and initiate sturgeon spawning in Hawai'i, and help farmers increase productivity and reduce costs.

The cool water Aquaculture Demonstration Project at College of Tropical Agriculture and Human Resources (CTAHR) Kula Agriculture Research Center demonstrates small cage culture applications, ornamental fish culture methods, integration of agriculture and aquaculture, and aquaculture education.

University of Hawai'i Sea Grant Extension in Maui County:

- Demonstrates techniques for water conservation, water re-use and integrated agriculture and aquaculture on commercial farms
- Collaborates with CTSA to distribute moi and milkfish to interested farmers throughout Maui, and assist the Hawai'i Division of Aquatic Resources in the stock enhancement of moi through periodic releases in the ocean surrounding Maui
- Assists CTSA to import sturgeon eyed yolk-sac larvae and fingerlings, and distribute animals to interested aquaculture farmers in Maui County
- Provides farmers with technical information and provide recommendations on topics such as pond preparation, seed stock supplies, stocking rates, feeding regimens, fertilization procedures, water management, hatchery operations, husbandry practices, disease management, harvesting, processing and permitting
- Conducts technical workshops that benefit Maui County aquaculture producers and collaborate to improve management and efficiency in Maui County aquaculture operations
- Ensures that farmers have access to approved chemicals for the treatment of diseases, maintenance of water quality, growth enhancement and spawning induction
- Collaborates with the Hawai'i Aquaculture Extension Network to investigate other organisms currently available in Hawai'i for culture potential



Project Loko I'a: Traditional Hawaiian Fishpond Restoration

Results and Impacts

- Collaborated with CTSA to distribute milkfish and moi to five Maui County producers in 2002
- Sturgeon fry importation is anticipated through the CTSA sturgeon project and plans for a second project year have been submitted and approved
- In discussions with the Maui Ocean Center to set up a pearl oyster demonstration project in 2004
- Conducted thirteen workshops with approximately 180 attendees each on aquaculture topics in Maui County
- Developed aquaculture educational programs at Pā'ia Learning Center and Lahainaluna High School
- Assisted various aquaculture businesses and organizations in receiving more than \$250,000 in grant funds



Keālia Pond National Wildlife Refuge Fisheries Assessment Project

Selected Publications

Howerton, R.D. 2001. Best management practices for Hawaiian aquaculture. CTSA publication 148.

Howerton, R.D., and C.E. Boyd. 1993. Design and performance of a horizontal axial flow water circulator. *J. Appl. Aquac.* (3):1/2:p163-183.

Kuyawe, T.T., D.K. Okimoto, R.D. Howerton, S.K. Shimoda, H.-R. Lin, P.K. Pang, and E.G. Grau. 1993. Effect of 17 α -methyltestosterone on the growth of the euryhaline tilapia, *Oreochromis mossambicus*, in fresh water and in sea water. *Aquaculture*, 113:137-152.

Howerton, R.D., and C.E. Boyd. 1992. Measurement of water circulation in ponds with gypsum blocks. *Aquac. Eng.* (11)3:141-155.

Howerton, R.D., D.K. Okimoto, and E.G. Grau. 1992. The effect of orally administered 17 α -methyltestosterone and 3,3,5-triiodo-L-thyronine on growth of seawater-adapted tilapia (*Oreochromis mossambicus*). *Aquac. Fish. Manage.* 23:123-128.

Boyd, C.E., and R.D. Howerton. 1991. Lecture notes for a post-graduate course "Water Quality Management in Fishponds". Deakin University, Australia.

Partners

- Maui County Office of Economic Development
- State of Hawai'i Aquaculture Development Program
- Maui Community College
- University of Hawai'i College of Tropical Agriculture and Human Resources
- Cooperative Extension Service
- U.S. Fish & Wildlife Service
- Lahainaluna High School
- Project Loko I'a
- 'Ao'ao O Nā Loko I'a O Maui (Association of the Fishponds of Maui)
- USDA Center for Tropical and Subtropical Aquaculture
- Pā'ia Learning Center



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Industry Applications

- Distributed 13 vials of human chorionic gonadotropin (HCG) to farmers for induced spawning
- In cooperation with UH CTAHR, an aquaculture demonstration site has been established at the Cooperative Extension Service Kula Agriculture station
- A proposal has been submitted to CTSA and is pending approval for year two-sturgeon hatchery technology

Education

- Collaborate with University of Arizona faculty to design and develop the Pā'ia Learning Center, which will have an aquaculture component
- Initiate the development of an undergraduate aquaculture program at Maui Community College and collaborate with faculty members to integrate aquaculture curriculum with existing and proposed programs including agriculture, marine science, biotechnology and sustainable technologies
- Develop and teach a for-credit undergraduate Aquaculture Topics course at Maui Community College



CTSA

University of Hawai'i Sea Grant Aquaculture Extension Specialist Robert D. Howerton has more than 10 years of experience working with researchers involved in developing technologies to improve production capabilities, hatchery operations, husbandry practices and identification of new species, and transferring these developed technologies to Maui County's aquaculture producers.

Howerton received his Ph.D. from Auburn University in 1991 and first gained experience as a State Specialist for aquaculture at Kentucky State University.

One of his current projects includes Best Management Practices for Hawaiian Aquaculture and Water Quality in Traditional Hawaiian Fishponds.

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