



## Disease Management in Hawaiian Aquaculture

October 1, 1994, through March 31, 1995

### Principal Accomplishments

Objective: Field test a preventive strategy to mitigate losses of cultured Chinese catfish (*Clarias fuscus*) during growout in Hawaii due to two bacterial diseases, *Aeromonas hydrophila* and *Edwardsiella tarda* septicemia.

*Aeromonas hydrophila* was isolated and will be grown for use in a vaccination trial. The ultimate goal of this effort is development of a vaccine to prevent the disease.

Objective: Screen juvenile and adult cultured Chinese catfish and tilapia (*Oreochromis mossambicus*) for potential pathogenic fish viruses.

Sixty tilapia of various ages and sizes were collected from five Oahu locations for a virus isolation study. Evaluation of various organ tissues revealed no viruses. These results support findings from previous tilapia disease cases on Oahu.



Both wild and cultured tilapia (*Sarotherodon melanotheron* and *Oreochromis mossambicus*) populations have been afflicted by a previously unrecognized syndrome that causes high mortalities. Production at several farms on Oahu has been negatively affected. Analysis of dying tilapia from various Oahu sites suggests that the cause is an intracellular rickettsia-like organism (RLO).

Dead and dying Chinese catfish from an Oahu farm that has a history of chronic disease problems were evaluated by cell culture methods for viruses. Evaluations of various organ tissues showed no evidence of an infectious virus.



Objective: Assess the infectivity of IHHN virus in feces after passage through the digestive tract of a species of water bird.

Two cages were constructed to hold the two juvenile night herons obtained for the study. The birds have adapted well to captivity and readily eat fresh fish and shrimp.

Objective: Provide diagnostic and health management support to the CTSA-funded project titled "Ornamental Aquaculture Technology Transfer."

Eight groups of ornamental fish were evaluated and found to be free of diseases.

Objective: Implement management practices and standard disease treatment strategies to improve fish survival and reduce the abundance of pathogenic parasites in imported groups of freshwater tropical aquarium fish.



Diagnostic assistance was provided to three farmers who were losing fry and juvenile discus stock. Parasite and water quality problems were found. Parasite treatments were suggested, and solutions to the water quality problems were recommended.

Water quality monitoring data on temperature, dissolved oxygen, pH, carbon dioxide, alkalinity, hardness, chloride, total ammonia, nitrite and nitrate are being gathered at an ornamental fish farm. The data will help in determining appropriate water quality.

Objective: Document the principal ectoparasites and assess their effects on cultured tilapia and mullet in a traditional Hawaiian fishpond.

Two species of tilapia (*Oreochromis mossambicus* and *Sarotherodon melanotheron*), and mullet (*Mugil cephalus*) from a traditional Hawaiian fishpond were examined for ectoparasites. The results are shown in Table 1.

Table 1. Ectoparasites and Pathogenic Infections Found in Cultured Tilapia and Mullet	
Tilapia	Mullet
<i>Caligus</i> sp.	Digenetic trematode metacercaria
<i>Neobenedenia melleni</i>	Epitheliocystis
<i>Trichodina</i> sp.	<i>Trichodina</i> sp.
<i>Scyphidia</i> sp.	<i>Scyphidia</i> sp.
	<i>Myxobolus equisquamalis</i>
	<i>Eimeria</i> sp.

Objective: Assess samples of *Gracilaria* spp for the presence of Gracilaria Gall Syndrome (GGS), determine how the syndrome is transmitted, and identify potential chemical controls for it.

A greenhouse was constructed at a cooperating commercial farm to conduct on-site experiments with infected *Gracilaria*. A series of observations on the farm has led to the suspicion that the freshwater might be a potential source of GGS. In March, a two-month experiment was undertaken to compare the onset and severity of GGS in *Gracilaria* exposed to different freshwater treatments. Two replicates were done of each of the following treatments:



- seaweed held in seawater with a freshwater every three days;
- seaweed held in 80 percent seawater and 20 percent unsterilized freshwater;
- seaweed held in 80 percent seawater and 20 percent UV-sterilized freshwater;
- seaweed held in full-strength seawater with no exposure to freshwater.

The effect of adding penicillin to seawater containing GGS-positive seaweed was tested. Preliminary observations suggest that penicillin reduces or eliminates GGS symptoms, which supports previous tests in flask cultures of GGS-positive *Gracilaria*. This implies a bacterial agent may cause GGS.

Objective: Provide aquaculture health management extension support to commercial farms.

In May 1994, a serious disease outbreak occurred in farmed *Penaeus vannamei* in Kahuku, Hawaii. It caused mortality rates higher than 95 percent within 14 to 30 days of stocking. Studies were initiated to determine the cause and a means of controlling the disease. This led to the discovery of a new virus in Hawaii thought to be the Taura syndrome agent. The discovery of Taura syndrome in Hawaii was confirmed in subsequent studies by other laboratories.

Additionally, this study found that *P. stylirostris* is largely resistant to Taura syndrome. The affected Hawaii farm has since begun culturing *P. stylirostris* and has achieved production levels equal to or greater than previous *P. vannamei* production.

In addition, project investigators made 80 site visits to 10 farms to provide health management extension assistance under this project.

## Investigators



Dr. Jim Brock,  
Aquaculture Development Program,  
Hawaii Department of Land and Natural Resources;

Dr. Brad LeaMaster,  
Department of Animal Sciences,  
College of Tropical Agriculture and Human Resources,  
University of Hawaii at Manoa;

Dr. Rick Spencer,  
Hawaiian Marine Enterprises, Kahuku, Hawaii.