

Mangrove Crab as a Model for Development of a Quarantine System to Screen Species for Aquaculture in Guam

November 1994 through July 1995

Principal Accomplishments

Objective: Establish an aquatic animal quarantine area at the University of Guam Marine Laboratory.

Two fiberglass tanks were installed in the fenced quarantine area at the Marine Laboratory.

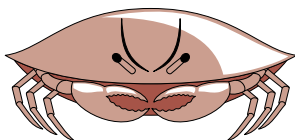
- The tanks were connected to 5-micron and 1-micron cartridge water filters and a UV-sterilizer on both inflow and effluent water. An appropriate effluent water pump and a float valve were installed, and plywood covers were placed over the tanks to keep debris out. Holding baskets with plastic glass dividers were purchased for the tanks.

An official from the Guam Division of Aquatic and Wildlife Resources visited the facility and suggested several improvements that will be carried out. Project investigators will work closely with him in order to have the system approved within the next year.

Objective: Capture local juvenile through adult mangrove crabs and transfer them into the quarantine area for pathogen and disease studies.

Nine crab traps were completed, and six more are being built.

- Four traps were deployed in the Ylig River and two traps were deployed in Ylig Bay in early June. A total of 12 crabs were caught. Gross examination revealed no lesions or parasites. Two crabs were dissected for histopathology.
- The remaining crabs were placed in the holding baskets, which were abandoned after one week because the crabs destroyed them. The animals were transferred to individual buckets suspended under a drip water distribution system within the quarantine tank.



Objective: Evaluate the economic feasibility of mangrove crab production in Guam as a prelude to further work in the area.

The mangrove crab (*Scylla serrata*) reaches more than 20 centimeters across and more than two kilograms in weight. It naturally ranges from South Africa to Hawaii and from Japan to New Zealand and is indigenous to Guam. Due to a lack of habitat and a large local demand, Guam imports approximately 3,000 live crabs per month. The crabs retail for \$8.25 to \$8.75 per pound and have a ready market.

Investigators reviewed the literature on crab culture in the Philippines and visited crab farms, crab fattening operations and crab sellers in Malaysia and Taiwan. Based on the information gathered, investigators project that mangrove crabs could be commercially cultured in Guam (Table 1), assuming the three following points:

- crabs could be cultured in ponds along with milkfish. This would necessitate displacing the milkfish on a pound-for-pound basis with crabs in polyculture;
- the physical management of the pond would not need to be modified so no additional costs would be incurred;
- commercial culture on Guam would use a maximum stocking density to produce one crab per square meter.

Table 1. Production Parameters in Taiwan, Malaysia, the Philippines and Guam				
	Taiwan (from farm visits)	Malaysia (from farm visits)	Philippines (from the literature)	Guam (projected)
Stocking Density (crabs per m ²)	1.7 to 5	4.3 to 5.7	0.5	1.0
Survival Percentage	100	?	88	75
Stocking Size in Grams	10	10 to 50	25.3	25
Harvest Size in Grams	360	175	231.6	340
Duration in Days	180	90 to 165	90	180
Growth Rate (grams per day)	1.94	1.0 to 1.39	2.29	1.75
Feed Conversion Ratio	1	10	1.72	2.5

These estimates of the physical production parameters are taken from data from the other locations and have no experimental basis on Guam. However, given these points, investigators estimate that replacing 3,000 pounds of milkfish per acre of pond with mangrove crabs would yield a net gain of more than \$9,000 (Table 2). Even using a stocking density yield of one crab per two square meters would result in a net gain of more than \$4,500 per acre. In fact, the preliminary analysis indicates that the addition of mangrove crabs to milkfish ponds will always increase the profitability of the ponds.

Table 2. Estimated Additional Profit From Replacing 3,000 Pounds Per Pond Acre of Milkfish with Mangrove Crabs in Guam	
Gain from Crabs:	
Sale of Crabs (3,000 pounds at \$8.50/pound)	\$25,500
Less seed crabs at \$0.40 each with 75% survival	\$ 2,333
Less feed at \$0.40/pound	\$ 3,000
Less additional harvest costs at \$0.50/pound	\$ 1,500
<i>Subtotal</i>	<i>\$18,867</i>
Loss from Displacing Milkfish:	
Sale of Milkfish (3,000 pounds at \$4.25/pound)	\$12,750
Less value of fingerlings at \$0.50 each with 100% survival	\$ 1,500
Less feed at \$0.26/pound	\$ 1,716
<i>Subtotal</i>	<i>\$ 9,534</i>
Net Gain from Replacing Milkfish with Crabs	\$ 9,333

Investigators

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