Proceedings of the Aquaculture Workshop for SEAFDEC/AQD Training Alumni; 8-11 September 1992; Iloilo, Philippines. SEAFDEC Aquaculture Department, Iloilo, Philippines. 1993. 173 pp.

MILKFISH BREEDING PROGRAM IN THE PHILIPPINES

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The National Bangus Breeding Project (NBBP) was established in 1981 in compliance with a presidential directive. Breeding and hatchery techniques for milkfish (*Chanos chanos*) developed by the Aquaculture Department of the Southeast Asian Fisheries Development Center (SEAFDEC/AQD) are adopted. The project is a joint undertaking of the Bureau of Fisheries and Aquatic Resources (BFAR) of the Department of Agriculture and SEAFDEC/AQD with the former as the lead implementing agency.

Goals and objectives

Long-range

- To increase milkfish fry supply in selected natural fry grounds, particularly those close to productive fishponds;
- To produce excess fry for export; and,
- To establish hatcheries in fishpond areas far from natural sources of milkfish fry.

Short-range

- To verify the milkfish breeding techniques developed by SEAFDEC;
- To accelerate the development of a simplified technology for propagating milkfish; and
- To test the economic viability of the milkfish breeding technology for commercial application.

Methodology

Milkfish juveniles (3-month old) are stocked and reared in brackishwater ponds or in fish pens. In addition to natural food, fish are fed supplemental feed pellets (35% protein) at 2% of their body weight. Four-year old fish are transferred to 10-m dia. floating net cages and fed crustacean feed pellets (42% protein) at 2% of their body weight. For 5-year old fish, feeding level is raised to 5% per body weight a few months before the onset of the spawning season.

Gonads of milkfish broodstock are regularly sampled. Based on the external and histological morphology of the sampled gonadal tissues, preparations for the natural spawning of the fish are made. A collector and a fine mesh

(*hapa*) net cage are set up in the cages. Scale-up of natural food organisms for milkfish larvae is started in the fish hatchery of the project sites.

Naturally spawned milkfish eggs are collected and packed in plastic bags for transport to the hatchery. The total number of eggs collected and rates of fertilization and hatching are calculated. Milkfish eggs are hatched and reared to 21-day old larvae following techniques developed at SEAFDEC.

At the start of the program, 12 experimental stations were established and maintained throughout the country but two sites (Regions 2 and 8) are unsuitable because of extensive damage to cages caused by frequent typhoons. These projects were suspended. The remaining ten stations maintain broodstock that are more than 5 years old. The Aquaculture Division of BFAR with its NBBP Coordinating Team monitors, coordinates, and administers the project.

Due to the increasing cost of maintenance and operation, financial assistance from the International Development Research Centre (IDRC) of Canada was sourced in 1985. In February 1986, the grant for four NBBP sites (Regions I, III, VII, and XI) was approved covering 4 years (1986-1989). With available funding, the following were achieved: (a) rearing of market-sized fish to breeders and (b) spontaneous spawning under varying ecological conditions at different sites. With the spawning of the broodstock, hatcheries in these stations were established.

Status of operation

The status of the NBBP stations throughout the country as of June 1992 follows:

REGION I

Location: NBBP office - Lucap, Alaminos, Pangasinan (300 km north of Manila); maturation cages installed in Hundred Islands (30 min. by motorboat from Lucap)

Date started: 1981

Stock:

Cage	No. of stocks	Age (yr/mo)	Ave. body wt. (kg)	Gonadal stage
1	85	9/6	4.5	Mature
2	49	8/8	4	Mature
3	50	8/8	4	Mature
	184			

Reported date of first spawning : March 1986; milkfish broodstock were reported to spontaneously spawn but limited number of milkfish fry were produced.

Hatchery facilities : Hatchery completed in 1987.

Present activities: Maintenance of three maturation cages with approximately 184 broodstock. Assessment of gonadal stage was made by

SEAFDEC/AQD staff in May 1992. Spawning occurred April 1992. Egg collection is ongoing. Hatchery activities underway but fry survival is very low. Hatchery facilities are operational and culture of natural food can be effectively done. The Fisheries Sector Program (FSP) of the Department of Agriculture is partly supporting the project in terms of feed requirement since 1991.

REGION III

Location: Office and maturation cage - Bamban, Masinloc, Zambales
Date started: 1981
Stock:

Cage	No. of stock	Age (yr/mo)	Ave. body wt. (kg)	Gonadal stage
1	44	9/6	3.5	Mature

Reported date of first spawning: March 1986
Hatchery facilities : Hatchery completed in April 1988
Present activities: Forty-four broodstock are being maintained in one cage. The previous stock escaped when the cages were washed away by a typhoon in 1988. Monitoring of spawning activities is ongoing. Hatchery facilities is not fully operational. Some equipment (blower, pumps, etc.) need repair. Feed requirement is being supported by FSP.

REGION IV

Location: Maturation cages - Tiniguiban Cove, Puerto Princesa City
Date started: 1983
Stock:

Cage	No. of stock	Age (yr/mo)	Ave. body wt. (kg)	Gonadal stage
1	18	9/0	5	Mature
2	30	5/0	3	Maturing
3	70	5/0	3	Maturing
4	200	4/0	25	Maturing
	318			

Reported date of first spawning: Spawning reported in 1989 but no record of milkfish fry production submitted.
Hatchery facilities: Hatchery completed in 1989.
Present activities : Maintenance of more than 100 mature and 200 maturing stock is ongoing. Aside from milkfish, the station is also engaged in the culture of other fishes (sea bass, siganids, mullet) and mollusc

under a searanching scheme. Hatchery facilities are existing but vital equipment to make it operational is needed.

REGION V

Location: Maturation cages - Damacan, Bacacay, Albay
Date started: 1983
Stock:

Cage	No. of stock	Age (yr/mo)	Ave. body wt. (kg)	Gonadal stage
1	191	5/3	4.5	Mature
2	39	5/3	4.55	Mature
3	100	4/3	2.91	Maturing
4	77	4/3	2.91	Maturing
5	92	4/3	2.91	Maturing
6	139	2/3	1.6	Developing
	638			

Hatchery facilities: None
Present activities: Maintenance of broodstock and cages. The station also undertakes culture of sea bass and siganids, and crab fattening.

REGION VI

Location: Maturation cages - Barangkalan, Caries, Iloilo
Datestarted: November 1989
Stock:

Cage	No. of stock	Age (yr/mo)	Ave. body wt. (kg)	Gonadal stage
1	13	-	4.3	Maturing

Reported date of first spawning: Since its establishment, no spawning activity was reported.
Hatchery facilities: None.
Present activities: The station is presently maintaining 13 milkfish broodstock that came from SEAFDEC/AQD. FSP supports the project for feeds and other materials. In addition to milkfish, mullets are also cultured in a separate cage.

REGION VII

Location: Maturation cage - Pangangan Is., Calape, Bohol
Datestarted: 1981
Stock:

Cage	No. of stock	Age (yr/mo)	Ave. body wt. (kg)	Gonadal stage
1	16	9/10	5.26	Mature
2	17	9/10	5.26	Mature
	33			

Reported date of first spawning: Spontaneous spawning was reported in October 1986.

Hatchery facilities: Hatchery was completed in 1987.

Present activities: Two maturation cages with 33 broodstock are being maintained. Spawning is in progress. Collection of milkfish eggs is relatively high but fry survival is very low. About 1,000 7-day old fry are reared in a 5-t fiberglass tank last May 1992. Hatchery facilities are being shared by NBBP and a shrimp project.

REGION IX

Location: Maturation cages - Sangali, Zamboanga City
Date started: 1981
Stock:

Cage	No. of stock	Age (yr/mo)	Ave. body wt. (kg)	Gonadal stage
1	7	5/5	4.35	Mature
2	108	4/9		Maturing
	115			

Reported date of first spawning: Since its establishment, no spawning activity was reported.

Hatchery facilities: None

Present activities: The station is maintaining two maturation cages with 115 broodstock. Some problems in support services exist. There is also a lack of technical staff.

REGION X

Location: Maturation cages - Punta Miray, Baliangao, Misamis Occidental
Date started: 1981
Stock:

Cage	No. of stock	Age (yr/mo)	Ave. body wt. (kg)	Gonadal stage
1	8	8/7	4.4	Mature
2	90	5/9	3.9	Mature
	98			

Reported date of first spawning: No spawning activity was reported since its establishment.
Hatchery facilities: None.
Present activities: A total of 98 milkfish aged 5- and 8- years old are being reared in two 10-m dia. cages. Some problems in support services.

REGION XI

Location: Maturation cage - Tagabuli, Sta. Cruz, Davao del Sur
Date started: 1981
Stock:

Cage	No. of stock	Age (yr/mo)	Ave. body wt. (kg)	Gonadal stage
1	69	6/8	4	Mature

Date of reported spawning: Spawning has been reported since April 1986.
Hatchery facilities: Hatchery completed in November 1987.
Present activities: Broodstock are maintained in a 10-m dia. cage. Hatchery facilities are not operational.

Region XII

Location: Maturation cages - Parang, Maguindanao
Date started: 1981
Stock: None
Reported date of first spawning: No spawning activity reported
Hatchery facilities: None
Present activities: There is no activity in the station. Maturation cages are partly submerged because of worn-out nets and dilapidated floats. The cages are not covered. Implementation of NBBP in Region XII was greatly hampered when the project was turned over to the Autonomous Region. Several administrative problems exist.

Problems and issues

The reorganization of the Department of Agriculture in 1988 brought changes in the administration of the project. BFAR which used to be a line bureau was reduced to a staff bureau, thereby losing its administrative control over the NBBP stations. All the stations, therefore, were transferred to the respective DA Regional Offices. The set-up greatly hampered the release of funds for the stations' operations. Supplies and equipment badly needed in the stations could hardly be provided, specifically feeds. Regional allotment is often insufficient and released very late. Hatchery facilities and laboratory equipment were neglected. Repairs were not immediately instituted resulting in bigger damages. Generally, the NBBP stations including the broodstock are poorly maintained and managed.

Inspite of the above conditions, the broodstock in all the stations continued to spontaneously spawn. Some fertilized eggs were collected but the insufficient knowledge of the staff assigned in the sites and the poor hatchery facilities resulted in very low larval survival. Sale of fertilized eggs had been resorted to, especially in Region I. Private hatcheries were invited to go into larval rearing with DA, with some promising results. With this success, more private hatchery operators became interested in leasing or buying milkfish spawners.

Plans for the NBBP

The Department of Agriculture recently initiated the privatization of all NBBP stations, and the following recommendations were made by BFAR after the NBBP sites were assessed in April-June 1992:

a) Region I - Since the private sector is interested in collaborating with the regional office on larval rearing, such collaboration should be considered. Outright lease or sale of broodstock should also be allowed.

b) Region III - The primary constraint in the success of implementing the project is insufficient personnel. Lease of hatchery facilities and broodstock or outright sale of breeders is highly recommended.

c) Region IV and V - The project has technically trained and capable staff. Appropriate support from the regional office is given. Most likely, NBBP in Palawan and Albay provinces will prosper. Hatchery facilities in Region IV was established through the initiative of the regional office, though some vital equipment is lacking. Both NBBP stations reported spontaneous spawning, and there are more than 100 mature broodstock. Lease or outright sale of excess broodstock is recommended in both stations.

d) Region XII - Three maturation cages in Parang, Maguindanao are partly submerged underwater. Nets are worn-out and floats are dilapidated. This is due to very limited funding allotted by the regional office. Termination of the project is recommended.

The government through DA-BFAR and SEAFDEC/AQD are finalizing the general guidelines on the privatization of NBBP. With its enactment, prospects of the project for future development are very high.

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