

ONGOING RESEARCH STUDIES ON MATURATION AND SPAWNING  
OF MILKFISH, CHANOS CHANOS AT THE BRACKISHWATER  
SHRIMP AND MILKFISH CULTURE APPLIED RESEARCH  
AND TRAINING PROJECT, JEPARA, INDONESIA

by

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Abstract

The paper gives an account of the research work carried out at Jepara, Indonesia, on induction of maturity of milkfish in ponds and enclosures, and procurement of the spawners from the wild for seed production by hypophysation. Seven to eight years old pond grown milkfish were found sexually immature. Experiments are being conducted for growing and inducing maturity in 1-2 years old milkfish in fertilized ponds with regular tidal flow of water and also under regular hypophysation program. Milkfish spawners collected from sea had a few males in oozing condition and females mostly spent.

Introduction

The UNDP/FAO project on Brackish Water Shrimp and Milkfish Culture Applied Research and Training, located at the Shrimp Culture Research Centre, Jepara (Central Java) Indonesia is actively involved in studies on maturation and spawning of milkfish as a dependable method for augmenting seed production of this widely cultivated fish. Cognizant of the limited natural supply of milkfish seed, the project, with the active support of two FAO fishery biologists, is actively engaged in:

- i) prospecting and locating new fry collection centres;
- ii) improving collection gear for increasing fry collections;
- iii) attempting induction of maturity of milkfish in ponds and enclosures;
- iv) collecting milkfish spawners from the sea for hypophysation and fry production.

Activities under items iii and iv above are pursued under the leadership of M. K. K. Sukumaran, Fishery Biologist (Induced Breeding) and the following information is extracted from the report he is now preparing.

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### Induction of Maturity in Ponds

Large milkfish, traditionally grown in deep tambaks, in east Java, were examined during the season when similar size specimens in the sea were ordinarily sexually mature. One lot of 20 specimens examined, ranged from 560 mm/1.4 kg. to 1030 mm/10.5kg. None of these specimens was sexually mature. Some of the specimens appeared markedly stout and weighed heavier than normal specimens of corresponding size; e.g., 950 mm/12 kg; 800 mm/9.5 kg; 600 mm/3.25 kg. Dissection and examination of such specimens showed a remarkable increase in fat deposition, particularly on the abdominal wall. According to pond owners, the large specimens weighing 10-12 kg are 7-8 years old.

Though information so far available does not show that Chanos normally attains sexual maturity in enclosed brackishwater ponds, there are stray records from such waters, of specimens showing early stages of gonadal development. Experiments were, therefore, initiated holding 1 1/2 year old milkfish, weighing 600 g and over in selected tambaks with regular exchange of tidal water, under a specified regime of fertilizer inputs and monthly injection of carp pituitary gland extract, for increasing growth and possible induction of gonadal maturation. Under identical conditions of habitat and population the injected lot shows better growth.

Larger specimens weighing up to 1.5 kg and 2 1/2 years old are also being held in ponds with regular tidal flow of water to see if gonads will respond to regular fertilizer inputs and program of compounded artificial feeds. Two ponds, each one hectare in area, with 1.0 to 1.2 meters depth of water, under a program of regular manuring with organic and inorganic fertilizers have also been stocked with year-old milkfish to grow them to larger size for further studies.

### Floating Enclosures

A floating enclosure, 6 m x 6 m x 6 m, with an extra 1.5 m height of netting projecting above water level, to prevent fish from jumping out, was put up in the sea near the Research Centre and 1.5 years old milkfish were introduced into the enclosure at the rate of 1/sq m. The enclosure was made of (2.54 cm) mesh polyethylene netting. Large plastic cans and bamboo frames were used to keep the enclosure floating. Fish were daily fed with a compounded, artificial feed cake, kept in a feeding tray. They readily accepted the feed and markedly improved in size during a period of three months, when heavy monsoon rains and wind badly buffeted the enclosure in the open,

unsheltered location and enabled the fish to escape. A new, more sheltered location for the enclosures has now been selected and four enclosures are being commissioned for further trials.

### Spawners Sanctuary

To produce large number of spawners for commercial operations and to make them available when required, large impoundments in suitable, sheltered locations along the coastal sea and stocking them with yearling or even bigger specimens of milkfish appear promising. A program of developing such a sanctuary of Karimun Jawa, about 90 km north-west of Jepara, in the Jawa sea is now under active consideration.

### Collection of Spawners from the Sea for Hypophysation

Schools of milkfish spawners have been reported from several parts of the coastal sea around the Indonesian archipelago, though there are no records of milkfish among sea fish landings. Arrangements made with provincial fishery administrations and fishermen resulted in the procurement of milkfish spawners. The details are given in Table 1.

Table 1. Details of milkfish spawners procured from three centers.

Place of Procurement	Date	Total Length (mm)	Weight (kg)	Sex	Remarks
South Sulawesi					
	12-12-72	103	9.0	Male	
	12-12-72	105	10.2	Female	
	12-12-72	102	8.7	Female	
	11-17-73	107.5	11.2	Males	Four male specimens studied
		to	to		
	11-17-73	115	12.8		
	11-17-73	103	10.6	Female	Weight of ovaries: 1472 g
	11-17-73	112.5	12.3	Female	Spent?
Tayu, C. Jawa					
	6- 9-74	107.5	10.0	--	
Manco, C. Jawa					
	9-11-75	96	6.35	Male	Oozing; testes: 155 g
	9-19-75	93.5	6.5	Male	Oozing; testes: 390 g
	10-20-75	101	9.0	Female	Ovaries: 450 g
	11-21-75	91	7.2	Female	Spent

Milkfish spawners are reported frequently caught by Karimun Jawa and dried/smoked ovaries examined indicated that the specimens were in fairly advanced stages of maturity.

Fishing for spawners was also organized at Karimun Jawa from May, 1975, using 4-7 inch (10.2-17.8 cm) bar gill nets, made of 210 D/12 - 15 nylon twine. So far 17 specimens were caught, of which 7 ranging from 1.4 to 2.75 kg in weight were immature while the rest were adult fish, 87.5 mm/ 4.75 kg to 102 mm/7.9 kg. in size. Females were all spent; while males were mature but not oozing.

When 4-4.5 bar gil nets were used the smaller specimens were gilled. The larger specimens were only entangled in the net and had no marks of gilling.

By periodic examination of the nets after setting, freshly gilled specimens could be taken out alive and held alive for several hours in specially designed cradles inside floating kapa nets in the sea.

### Remarks

It appears quite practicable to catch milkfish spawners from the sea from areas where they are known to frequent. However, for hypophysation, mature male and female spawners are to be available simultaneously and to ensure this organized fishing - gill netting and possibly purse-seining, employing several vessels and a team of technical workers prepared to handle the spawners in the sea itself are required. Getting the spawners in the proper stage of maturity for hypophysation now appears the most difficult problem. Availability of suitable injection material could also become problematic, since it is extremely difficult to get mature or maturing specimens of species closely related to Chanos for pituitary glands collection. A limited stock of pituitary glands of Hilsa toli from Bombay has already been collected for trials. Both Hilsa toli and Hilsa macrura are available in Indonesian waters and might possibly be the best donor species for hypophysation of milkfish. With the present level of technology in spawning, hatching of eggs and larval rearing, of mullet and penaeid shrimps, actual spawning, hatching and rearing of milkfish should not present insurmountable problems, particularly since Chanos hatchings are of relatively large size.