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## RESEARCH ARTICLE

### NATURAL OCCURRENCE OF CHANOS CHANOS FRYS IN CHINNAPALEM AREA OF PAMBAN COAST IN TAMILNADU

Jaikumar, M.

Aquaculture Foundation of India, 40/4, Kapaleswarar nagar, Neelankarai , Chennai.600115, TamilNadu, India

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#### ABSTRACT

Milkfish (*Chanos chanos*) is one of the most important brackish water finfish species being cultured in Southeast Asia. Natural Chanos fry occur along the south east coast of India in fairly large numbers during the months of March-June and October-November. Its abundance, distribution and seasonal variation are discussed for their utilization in aquaculture. The collection of natural frys and nursery rearing in Chinnapalem near Pamban is given with a cost estimate. This Article covers the ecology of the milk fish frys and their mass scale migration from coral reef environment to mangrove mudflat is described.

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#### INTRODUCTION

The milkfish (*Chanos chanos*) is an important food fish in Southeast Asia (Sumagaysay, 1998). Aquaculture of milkfish was begun in Indonesia over 500 years ago, followed by Taiwan and the Philippines. In 2007, the global production reached more than 0.5 million tonnes. Major producing countries were the Philippines, Indonesia and Taiwan (FAO, 2009). The milkfish is a marine fish and commercially cultured in brackish-water ponds and inshore waters as well even in hyper-saline lagoons (Lin *et al.*, 2003). Milkfish can tolerate salinities of 0-158 ppt (Lin *et al.*, 2001). Fry, juvenile, or later stages of development can survive well in fresh water, which indicates that they can be cultured in freshwater ponds or stocked in cages in freshwater lakes and reservoirs (Alava, 1998; Lin *et al.*, 2003). Marine or freshwater adaptation by euryhaline teleosts is a complex process involving a set of physiological responses related to ion regulatory requirements; nevertheless, the milkfish is considered to be an efficient osmoregulator with a high capacity for adaptation to freshwater production systems (Lin *et al.*, 2003). Apparently small milkfish tend to adapt better to fresh water than to hyper-saline water and larger milkfish find hyper-saline water less stressful than fresh water (Ferraris *et al.*, 1988). It usually spawns in shallow sandy coasts that have clear and unpolluted water (Fig.4). Milkfish are similar in appearance to many other species of fish but can be distinguished through a number of taxonomic features (Figure 1):

- Body elongate, moderately compressed, smooth, and streamlined

- Body color silvery on belly and sides grading to olive-green or blue on back
- Dorsal, anal, and caudal fins pale or yellowish with dark shades
- Caudal fin large and deeply forked
- Pelvic fins abdominal in position, with auxiliary scales
- Scales small and smooth
- Mouth small, terminal, without teeth
- Lower jaw with a small tubercle at tip, fitting into a notch in the upper jaw
- Only 4 branchiostegal rays support the underside of the gill covers
- Intermuscular bones long and numerous.

#### Fry Collection

Ganapathi *et al* (1950); Chacko and Mahadevan (1956), Tampi (1957), Mohan (1984) and Dorairaj *et al* (1984) have dealt with collection of milkfish frys in India. 'Kondodi' net, a modified drag net along with a scare-line was used for collecting fingerlings. The mesh size of the net was 15 mm. Fingerlings were collected during the early mornings before the sun rise. The catches decline where the sun reaches midday and the subsequent increase in water temperature. The suitable time of collection is 0530-0730 hrs (Lal Mohan, 1990).



Fig 1. Adult Milk Fish

**Areas of occurrence**

Milkfish fries occur in large quantities from Manouli island, Rameswaram island (Pamban, Chinnapalam creek etc.), Pillaimadam lagoon, Panaikulam, Vaalinokam, backwaters of Vedarnyam Adyar creek in Chennai, Pulicat lake in Tamilnadu coast etc (Panikkar et al 1952). Apart from these areas of occurrence of the milk fish fries are reported along the west coast in Cochin backwaters, Calicut and Elathur (Mohan, 1984; Lazarus and Nandakumaran, 1987) However their abundance is not comparable to the Pamban coast. Tampi (1959) estimated that 400-600 million chanos fry occur in Peninsular India, but the present estimate is considered to be about 200-250 millions based on the observations along the east and west coast (Lal Mohan 1990).

fingerlings per day have been collected for about 10 days during the first week of August (Lal Mohan 1990).

**Seining of Frys**

**Women collecting frys**



Milkfish fry

Fig. 3. Milk fish fry collection area in Chinnapalam, Pamban coast of Tamilnadu

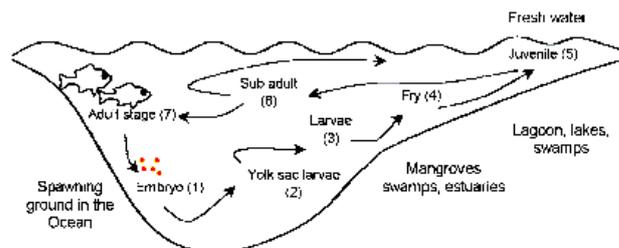


Fig 4. Life History of Milkfish represented by seven developmental stages from embryo to adult. (Lee 1995)

Fig.2. Satellite map showing milk fish fry collection area in Pamban coast of Tamilnadu

**Seasons of abundance**

There is a creek of >1.0 km stretch with full of mangroves near the Pamban sea shore, where a pool has been created by cutting mangroves for fry collection during the low tide. The milkfish fry that migrate along with the creek get collected by seine nets by women in the village at the tidal pool. Milk fish seed occur in south east coast of India during two seasons (Evangeline, 1967). The primary season was found to be from March-June and the secondary season from November-December. During the primary season the catch per haul was as high as 1200 fingerlings in the Chinnapalam creek area, when a seine net of 2-3 meter long dragged for 30 minutes by two persons (Fig.3). Maximum number of seed measuring 20-30 mm were collected during the first week of April. During the next season the fingerlings were collected from Panaikulam creek near Mandapam during second week of November. A few fingerlings were obtained from Manouli Island also. Along the west coast of India, fries measuring 40-60 mm occurred in Calicut during July - August. About 1000

**Size range of the seed**

Size range of the fries vary according to the period of collection. The needle shaped fry measuring 10-15 mm have been collected from Manouli island, Rameswaram island and Pillaimadam lagoon during March (Lal Mohan, 1990). The fries grow to the sizes with a length of 20- 40 mm, 40-80 mm and 80-110 mm in April, May and June respectively. The fries grow to 120 mm and migrate back to the sea in July. During the secondary season fries of 40-60 mm were reported to occur during October in the Panaikulam creek near Mandapam (Lal Mohan, 1990) (Fig.2). Collection and marketing of chanos fries in south east coast of Tamilnadu is under the control of Department of Fisheries Government of Tamilnadu. The fry is collected from the tidal pool of Pamban sea shore and transported in Aluminium containers with perforated lids. Due to the habitat degradation and over exploitation the abundance of milk fish fries has declined along the Pamban coast which was once valued as the most productive area for the fries. The creek, with mangrove vegetation is getting silted up. Further in such areas as Pillaimadam lagoon, the fries and fingerlings are caught in large quantities and dried under sun for human consumption. Large drag nets with <10 mm mesh size were used to collect fingerlings. Nearly 20 fishermen operate each net. It was observed that the average number of milk fish seed,

**Table 1. Cost for construction of chanos seed rearing facility at Chinnapalam, Pamban**

S.No	Particulars	Rs.in Lakhs
1	Land 0.5 acres to be acquired from the government	Free
2	Cement concrete tanks of 200 sq.m capacity- 2nos@Rs. 3000/-per sq.mtr	12.0
3	Air Blower 3 HP Capacity with aeration system	1.0
4	Disel engine operated air- blower	0.75
5	Shed for accommodating seawater pumps, air blowers and for seed packing	1.0
6	Seed collection Net, filter Bags, Plastic bins, buckets, Scoop- net, oxygen cylinder, furniture etc.	0.25
7	Electricity deposit and wiring	1.0
	<b>Total</b>	<b>16.0</b>

**Assumption**

S.No	Particulars	
1	Number of Cement Tanks	2
2	Area of each tank	200 sq.mtrs
3	Total area of two tanks	400 sq.mtrs
4	Stocking density of Chanos fries	1000/sq.mtrs
5	Duration of each crop	7 days
6	Survival expected	80%
7	Total seeds reared in one crop	3.2 lakhs
8	Number of crops in one season	8
9	Total seeds to be reared and supplied	2.5 million

**Operating cost**

S.No	Particulars	Rs
1	Cost of Feed @Rs.500/lakh for 2.5 million	12,500
2	Cost of Diesel	5,000
3	Electricity charges @Rs.5000/-per month for 3 month	15,000
4	Seeds will be collected by the members of the society	-
5	Packing Materials and Miscellaneous	67,000
	<b>Total</b>	<b>1,00,000</b>

collected from Ramnad and Tirunelveli coast during 1950-55 was 26.4 million and it has come down to 0.62 million in 1957-1960, (Tampi, 1968) indicating the decrease in the abundance of fries in the traditional seed collection grounds. Farmers from kerela visit every year for the purchase of Chanos fries and taken them to quilon in kerela for culture in ponds. Chanos withstand transport for more than 1 2 hrs. (Ranganathan and Ganapathi, 1949; Dorairaj *et al.*, 1984; Lazarus & Nandakumaran, 1987). There is heavy mortality during collection and storage in pools without aeration. Therefore it is proposed to start nursery rearing in the collection centre itself and the cost worked out for this is given below (Table-1). Instead of selling the fries for Rs.150/1000, the reared fries in nurseries can be stocked in cages/pools in the coastal area of Pamban and grown to harvestable size. Thus it is possible to develop chanos culture in Tamilnadu. This natural gift of chanos fries should be will protected from over exploitation and degradation of environment cutting of mangroves should not be allowed.

**Revenue Realization**

Cost of Milk fish seeds@Rs.500 per thousand for 2.5 million Rs. 1.25 millions.

Less: Operating cost (1.25million – 0.1 million =1.15 million) 10% of the gross revenue (i.e Rs. 1.25 lakhs) will be set aside for operating cost in the next season. The society will 20 members will get an income of Rs.1.025million for each season i.e, amount Rs.0.34 million/month, and Rs 17,000/member/month approximately.

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