

MILK FISH CULTURE IN NET ENCLOSURES IN THE PILLAIMADAM LAGOON, NEAR MANDAPAM, TAMILNADU

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ABSTRACT

*Pillaimadam lagoon covers an area of 850 ha. The substratum of the lagoon is muddy with 48% fine sand. The water level was low during August-September. Salinity varied between 14 (November) and 133‰ (September). The dissolved oxygen level fluctuated between 2.2 and 6.9 ml/l and the water temperature from 23 to 32°C. In the Pillaimadam lagoon, 0.25 ha, 0.5 ha and 1 ha areas were enclosed with nylon webbings. The pens were stocked with milk fish and the stocking densities in these pens were 4000, 6000 and 8000 nos/ha. Growth of *Chanos sp* was appreciable. Some of the constraints in culturing of milk fish in the lagoon and the ways and means to overcome these are discussed.*

INTRODUCTION

India has vast potentials for pen culture with its extensive lagoons and low lying areas (Alagaraswamy, 1978; Rao, 1978). The availability of fish seeds in large quantities is another advantage to attempt large scale fish farming (Tampi, 1973). Considering the above, an investigation was made in the Pillaimadam lagoon to find out the feasibility of utilising this area for pen-culture practices.

MATERIAL AND METHODS

Culture site

Pillaimadam lagoon is one of the natural lagoons located along Palk Bay, near Mandapam (09° 17' N and 79° 06' E). It extends 5.2 km in length

and 0.5 to 1.5 km breadth covering a water stretch of about 850 ha. The maximum depth of the lagoon during the peak monsoon was 1.7 m. During August-September the water level decreased to 30 cm. and the major part of the lagoon was exposed. The bar mouth on the eastern part of the lagoon opens during Oct.-Dec. (monsoon period) and closes during Aug.-Sept. The substratum of the lagoon was muddy and consisted of 3.5% coarse sand (0.6 - 1.2 mm), 48% fine sand (0.3 - 0.6 mm), 11% very fine sand (0.15 - 0.30 mm) and 2% silt (0.7 - 0.15 mm) in the central portion where the pens were erected. The wind velocity fluctuated from 3 to 75 km/h depending on the season. Rainfall though restricted had profound influence on the hydro-biological condi-

ions of the lagoon. The water level at low tide in the lagoon ranged from 80.2 to 93.3 cm and at high tide, 164 cm

RESULTS

The average monthly salinity ranged from 15 to 89‰, during the year 1982 though the individual value was as high as 133‰ in September and 14‰ in November (Table 1).

Based on the salinity, the hydrological conditions can be classified into a period of low salinity, (hyposaline) moderately high salinity (mesosaline) and high salinity (hypersaline). The hyposaline condition extended from November to January with a salinity values of 14 to 25‰. Whereas the mesosaline condition prevailed from February to May and in October when the salinity was 26 to 47‰. June to September was the period of hyper salinity and during these months average monthly salinity was in the range of 50-89‰. Individual salinity during these periods was as high as 133‰. (Table 1). The dissolved Oxygen content ranged from 2.2 to 6.9 ml/l. It was low during April and July to September whereas high values were recorded during November and December (Table 1). The water temperature fluctuated between 23 (December) and 32°C (April). Low temperature values were invariably recorded during November-January. The water temperature seemed to be influenced by depth of the water column, wind velocity, and the tidal flow. The depth of the water column ranged from 60 to 82 cm. during October to January. The water level started receding from February to June but maintained a depth of 42 - 58 cm.

and during Aug. - Sep. the water level was low (20 - 30 cm.). The highest depth was recorded during November and the lowest during September.

The Net Enclosures

Areas of 0.25, 0.5 and 1 ha were enclosed with 1mm nylon webbing. The mesh size of the webbing was 20 mm. Palmyra poles measuring 3 m. length, 15 cm. wide and 5 cm. thick were used to support the webbing. The poles were pointed at one end. They were driven into the mud at 50 cm. 1.5 m apart. A (2 mm) polythene rope served as a head rope and foot rope. The head rope was attached to the nail driven at the top of the poles so that the webbing was firmly held to the poles. The laterite stones were attached to the foot rope at an interval of 1.5 m. The stones along with the foot rope and webbing were anchored about 40 cm in the mud. A slackness of 1 m. for every 10 m. of webbing was allowed so that the webbing was not held in tension. The webbing was tied to the poles firmly. A scareline made of palmyra tender leaves attached to a polythene twine at an interval of 1 m. was tied inside the enclosure about 50 cm above the bed of the pen so that the fingerlings would not dash against the webbing and got themselves injured.

Fishseeds

Chanos chanos (75 to 120 mm size) were collected from the Pillaimadam lagoon or from Manouli island with the help of a 10 mm mesh dragnet measuring 12 m in length. The mouth of the net was held open by means of bamboo poles. Mosquito net was also used. The scare line made of coir rope and palmyra leaves was dragged along with

TABLE 1:- *Hydrological parameters of the Pillaimadam lagoon during 1982 (monthly average values)*

	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
Salinity (‰)	25.5	37.1	41.2	46.3	46.9	56.7	81.8	86.2	89.2	43.0	20.0	15.0
Oxygen (ml/l)	4.4	4.8	3.8	2.2	4.8	4.0	3.0	2.5	2.9	3.8	6.2	6.9
Temp. (°C)	24.4	30.0	29.4	32.0	31.5	29.6	27.6	29.0	29.0	29.0	26.0	23.0
Depth (cm)	10.5	4.7	5.6	5.6	5.0	4.2	2.5	1.5	1.0	1.0	4.0	5.2

the net in unison. The collected seeds were kept in plastic container (40 l) with lagoon water and transported to the pens immediately. About 60-70 fingerlings were kept in a container. The chanos fingerlings were stocked in 3 pens measuring 0.25 ha. each at the rate of 4000, 6000 and 8000 nos./ha. No artificial food was given. Monthly sampling was made to assess the growth of the fingerlings stocked. The results obtained on growth are presented in Table 2.

DISCUSSION

Chacko and Mahadevan (1956) and Tampi (1960) reported that the chanos fingerlings of length 50-85 mm grew to 240 to 300 mm in one year. Ramamurthy *et al.* (1981) recorded faster growth of 249 mm in 111 days. Mohan and Nandakumar (1981) observed that the chanos fingerlings measuring 85 mm grew to 310 mm in 210 days in the polythene lined ponds in Calicut. Shanmugham and Bensam (1982) recorded the growth from 23-26 to 155-225 mm in 180 days when cultured in pens at Tuticorin. Marichamy and Rajapackiam (1982) obtained a growth of 277 and 346 mm during 210 days and 365 days respectively. In the present observation the chanos fingerlings measuring 107 mm attained a length of 210 mm in 60 days. The growth rate can be considered as fairly good.

Canagaratnam and Davis (1960) and Kinne (1969) found that salinity above 55 ppt adversely affects the growth of chanos. The present study also confirms the above observation. The period of August - September was found to be critical for the culture of fishes in the lagoon as the strong south

west wind drained the water in the lagoon and prevented the entry of sea water into the lagoon. But this unfavourable condition can be overcome by selecting a suitable month for stocking in such a way that harvesting can be done before the onset of the unfavourable condition.

Of the fouling organisms the barnacle *Balanus amphitrite* settled in large numbers on the poles but not on the nylon webbing. Nevertheless the nylon webbing gets damaged when it rubs against the barnacles attached to the palmyra poles. The algae that entangle in the net often affect the free flow of water in the pens. The predatory birds like cormorants, eagles, pelicans, storks and cranes were found to feed the fish especially when the water level was low in the lagoon. Marichamy and Rajapackiam (1982) suggested that the predatory birds can be driven away by scaring them using crackers. The bird menace can be prevented by using large meshed nets over the pen. *Tilapia* often gains entry into the pens in the fry stage and competed for space or cause instability to the poles and enclosures by making depressions (nests) near the enclosures. It could be prevented by periodic visit and inspection and the nest could be levelled whenever noticed. In the present experiment nylon webbing showed signs of damage and loss of strength after 6 months of exposure. Whereas the polythene mesh made of 1 mm. twine was in good condition even after its exposure in the lagoon for 18 months. The experiments conducted in the lagoon clearly demonstrated that the large scale fish culture in enclosures may be viable for adoption by fish farmers to augment the fish production.

TABLE 2:- Growth of chanos in different systems

Culture system	Locality	Initial		Final		Stocking density (no/ha)	Culture period (days)	Survival (%)	Production (kg/ha)	Salinity (‰)	Author
		Length (mm)	Wt. (g)	Length (mm)	Wt. (g)						
Pond	Krusadai	50-85	—	240	—	—	365	—	—	—	Chacko & Mahadevan (1956)
Pond	Mandapam	80	—	300	—	2500	365	9-11	212-455	31-45	Tampi (1960)
Pond	Calicut (Polythene lined)	85	—	310	202	5600	210	86	920	0.7	Lal Mohan & NandaKumaran (1981)
Fishpen	Tuticorin	23-26	0.35	155-225	41	10,000	180	—	—	10-37	Shanmugham & Bensam (1982)
Pond (poly-culture)	Tuticorin	42	0.8	346	268	714	365	59	114	—	Marichamy & Rajapackiam (1982)
" "	"	50.2	0.9	277	193	4982	210	8.1	133	27-73	
" "	"	29.0	0.1	215	68	3500	225	50.1	192	—	
Pond	Mangalore	37	—	249	—	1000	111	—	—	—	Ramamurthy <i>et al</i> (1978)
Pen (net enclosure)	Mandapam	108	9.5	242	103	6000	66	—	—	56-83	Present study

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