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PART 1 : PRAWN CULTURE

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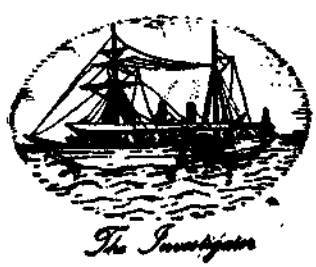

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PRAWN AND FISH CULTURE IN POLYTHENE FILM LINED PONDS AT CALICUT SEA SHORE

Abstract

A fish farm with polythene film lined ponds is developed on the sea shore of Calicut for culturing fishes and prawns. Commercially important prawns like *penaeus indicus*, *Metapenaeus dobsoni* and *M. monoceros* and the fishes *Chanos chanos*, *Mugil cephalus*, *Liza subviridis*, *Liza parsia*, *Lates calcarifer* and *Megalops cyprinoides* were cultured in these ponds. Suitability of polythene film lined ponds for fish and prawn culture is discussed.

FISHES AND PRAWNS were cultured in various ecological environments. Apart from the conventional and traditional fish farms many contraptions like cages, fish enclosures and fish pens are also developed. Wheeler (1966) and Tabb *et al.* (1969) reared fish and prawns in the polythene lined ponds in U.S.A.

To find out the feasibility of utilising the fallow sandy sea shore for fish culture, experiments were conducted in the Calicut sea shore by lining the ponds with polythene film of suitable thickness and stocking them with fishes and prawns. The polythene film lining effectively prevents the seepage of water.

Materials and Methods

Ponds measuring 0.02 to 0.1 ha were made in the Calicut sea shore in 0.4 ha area (Plate I A-D). The ponds were given 60° slope. The black polythene film of 150 μ thickness and of width 3.7 to 6.1 mm was used for lining the ponds. The film of required width were made by fusing the free ends of the film by using a hot iron over a cellophane paper. All the hard objects were removed from the pond before spreading the film. The free ends of the film were properly anchored along the border of the pond in a trench of about 30 cm wide and 30 cm deep. Beach sand was spread on the bottom of the pond. This layer of sand prevented the absorption of the sun light by the black film and provided substratum for the prawns and fishes.

Sea water was pumped by a 3 H.P. diesel pump kept on the sea shore. The foot valve and the distal end of the delivery pipe were properly covered with a velon screen net of 1 mm mesh size so as to prevent the entry of fishes and prawns into the ponds.

The ponds were stocked with seeds of *Penaeus indicus*, *Metapenaeus dobsoni*, *M. monoceros*, *Chanos chanos*, *Mugil cephalus*, *Liza subviridis*, *Liza parsia*, *Lates calcarifer* and *Megalops*

cyprinoides collected from the surf, low lying areas and estuaries with a rectangular drag net made of velon screen.

The prawns and fishes were fed with various artificial feed. Till the prawns attained 30 mm length, they were fed with dry fish meal at the rate of 1/5th of the body weight twice a day. The fish meal was prepared by pulverising dry trash fish, waste and prawn heads. Prawns after 30 mm length, the carnivorous fishes and mugils were given fresh minced prawn head peelings at the rate of 1/10 of the body weight. The feed for milk fish was prepared by boiling broken rice, prawn head and sardine oil mixed at the ratio of 10 : 1 : 0.1 and fed at the rate of 1/10 of body weight. In one of the experiments prawns were also fed with this food.

Results

Table 1 summarises the results of various experiments with different stocking rates and species composition. The growth rate of prawns were found to be slow when compared to that in natural environment. But very high survival rate was observed in short-term culture experiments with the duration of less than 120 days. Survival rate for the prawns was found to be low when the stock was kept for more than 150 days.

In the polythene film lined ponds *P. indicus* grew to 136 mm weighing 16 g during 272 days with 32% survival, whereas it attained 98 mm weighing 4.2 g in 98 days with 97% survival. Growth rate was also found to be faster in the first four months. *M. dobsoni* and *M. monoceros* were found to attain 87 mm weighing 5.5 g and 5.8 g during 288 days. Prawns were also cultured along with *Mugil* spp. to observe the growth of prawns when stocked with other compatible fishes. In the polyculture experiments also the growth of prawns were found to be more or less same as in the monoculture experiments (Table 1).

L. subviridis attained a length of 207 mm weighing 78.5 g in 182 days with a high survival rate of 92%. *M. cephalus* grew to 376 mm weighing 533 g during the same period. But due to the non-availability of the seeds of *M. cephalus* further experiments with this species could not be designed. *L. parsia*, a slow growing species attained 129 mm only weighing 20.8 g during 288 days. The growth of *C. chanos* was found to be good in this system. It attained 357 mm weighing 453 g in 234 days with 96% survival. The growth rate was slow after 5 months. *Calcarifer* was also found to grow well. It attained 370 mm weighing 600 g during the period of 520 days with a high survival rate of 100%. *M. cyprinoides* attained 185 mm from 95 mm during 190 days with 100% survival.

It was observed that the growth rate was more or less same for the various artificial feeds tried (Tabel 1).

Discussion

George *et al.* (1968) found that female *P. indicus* attained a length of 141-145 mm during the first year of its growth in the natural conditions. During the culture experiments by the Central Marine Fisheries Research Institute Cochin (CMFRI, 1978) *P. indicus* and *M. dobsoni* were found to grow to 41-145 mm and 36-70 mm respectively in paddy-cum-prawn filteration ponds during 152 days, whereas in the perennial ponds *P. indicus* attained 121-150 mm weighing 17 g with a survival rate of 75% during 105 days. However in another pond *P. indicus* and *M. dobsoni* attained an average length of 96.2 mm and 71.7 mm weighing 10.5 g and 1.8 g respectively for 122 days. Mohammed *et al.* (1980) recorded a growth of 139 mm for *P. indicus* in the salt pan reservoirs of Tuticorin with a stocking rate of 26,666/ha during 154 days. When compared to the growth attained by the

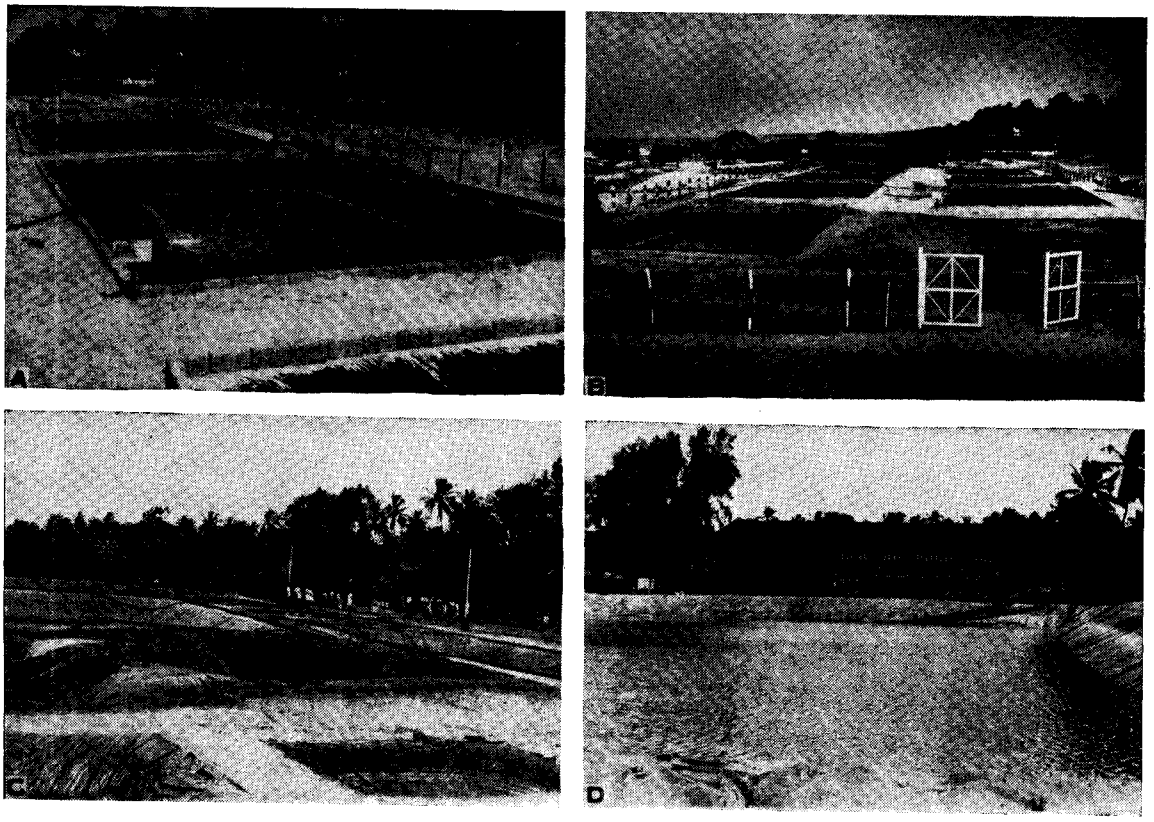

PLATE 1. A. 0.01 ha polythene film lined pond ; B & C. View of the polythene film lined ponds ; D. 0.1 ha pond.

TABLE 1. *Details of the fish and prawn culture experiments in polythene film lined ponds*

Species	Area (ha)	No. stocked	Rate of stocking/ ha	Duration (in days)	Length stocking (mm)	Harvest (mm)	Wt. at harvest (gm)	Survival rate %	Food	Salinity (ppm)	Dissolved oxygen (ml/l)
Penaeus indicus	0.03	440	14,700	272	40	136	16	32	Peeled prawn head at 10% of body wt.	4.6-56.0	2.5- 5.0
P. indicus	0.02	1,296	64,800	155	40-60	98	4.2	97	,,	4.6-56.0	2.6- 5.3
P. indicus	0.02	1,200	56,000	246	20	115	15	45	Rice boiled with prawn head, sardine oil at ratio 100 : 10 : 1 at 10% of body wt.	5.7-5.20	2.5- 5.0
P. indicus	0.02	1,700	85,000	245	7-8	120	15	24	,,	5.7-55	2.5- 5.2
Metapenaeus dobsoni		342	17,100	,,	7-8	91	3.6	28	,,		
Liza subviridis		120	6,000	,,	30	207	76	96	,,		
P. indicus	0.06	540	9,000	288	40-50	137	16	8.5			
M. dobsoni		2,650	44,833	,,	40-50	87	5.5	2.8	Peeled prawn		
M. monoceros		250	12,500	,,	40-50	87	5.8	2.3	head at 10%		
Liza parsia		214	3,566	,,	18-19	129	20.8	90	of body wt.	0.9-47.5	2.9- 6.3
Liza subviridis		101	1,683	,,	18-19	205	116	95			
Valamugil scheli		13	216	,,	18-19	207	77.8	100			
Liza subviridis	0.02	30	1,500	182	10-13	207	78.5	92	Peeled prawn		
Mugil cephalus		2	200		10-12	376	533	100	head at 10% of body wt.	4.6-52.0	2.6- 5.2
Chanos chanos	0.02	26	1,300	234	10-12	357	453	96	Boiled rice, fish meal and	5-42.0	3.0- 6.0
Liza subviridis		200	10,000		18-19	191	110	80	sardine oil at 100 : 10 : 1 ratio at 10% of body wt.		
Lates calcarifer	0.02	25	1,250	520	10-13	370	600	100	Peeled prawn heads at 10%		
Liza subviridis		66	3,300	272	23-33	217	82.5	80	of body wt.	7-42.0	2.5- 5.7
Megalops cyprinoides	0.02	125	6,250	190	95	185	53	100	Peeled prawn heads at 10% of body wt.	2.0-15.0	0.7-7

prawns in the natural systems, the gorwth of prawns in the polythene film lined pond is less, but the growth of fishes in this system is quite comparable to that in natural ponds. Ramamurthy *et al.* (1978) observed that *M. macrolepis* (*L. subviridis*) and *Chanos* attained a length from 40 to 220 mm and 249 mm during 191 and 111 days respectively at a stocking rate of 1400/ha and 1000/ha in the brackishwater ponds near Mangalore. *L. subviridis* attained a length of 207 mm and *Chanos* 250 mm during 182 and 96 days respectively in the polythene film lined ponds at a stocking rate of 1500/ha and 1300/ha (Fig. 2). It may be observed that though the growth of *L. subviridis* in the present study is comparable to that of the brackishwater natural ponds, the growth of *Chanos* is found to be better in the polythene film lined ponds. The growth of *L. calcarifer* and *M. cyprinoides* were found to be from 10-13 mm to 370 mm weighing 600 g in 520 days and 95 to 185 mm weighing 53 g in 190 days respectively.

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