ON AN EXPERIMENT IN PRAWN-CUM-TILAPIA CULTURE IN PADDY FIELD

K. RAMAN[1]
Central Marine Fisheries Research Institute, Cochin

ABSTRACT

An attempt to culture *Tilapia mossambica* along with prawns in an experimental farm near Vaikom in Kerala, showed a good scope for adopting this fish as a secondary crop in prawn fishing fields.

INTRODUCTION

To make use of the low-lying coastal areas for fish culture, Panikkar (1952) has pointed out the need for introducing suitable quick-growing species of fish. With this aim in view, *Tilapia mossambica* was introduced into India in the early fifties (Devadas and Chacko, 1953; Panikkar and Tampi, 1954). Though several attempts to culture other species of the genus (*T. galilaea* and *T. nilotica*) along with the common carp have been made in other countries (Sarig, 1955; Yashouv, 1958) none has been reported from India. However, studies conducted at the Central Inland Fisheries Research Sub-station, Cuttack on the compatibility of *Tilapia mossambica* with common carp and Indian major carps have shown that the presence of *Tilapia* adversely affects the growth and survival of these fishes (Anon, 1959, 1960*a*, *b*). During the prawn fishing seasons of 1958 and 1959, when some statistically designed experiments were carried out on the paddy field prawn fishing in an experimental prawn farm of the Central Marine Fisheries Research Sub-station located near Vaikom, Kerala (Raman and Menon, 1967), an attempt was made to culture *Tilapia mossambica* along with prawns. The results obtained are reported here.

EXPERIMENTAL OBSERVATIONS AND CONCLUSIONS

The experiment was carried out in two small enclosures, each of 0.05 ha, made by putting up subsidiary bunds in the paddy field. Water at high tide was let into these enclosures by keeping a close-meshed net at the opening of one of them (Control) in order to prevent the entry of post-larvae and young prawns;

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1 Present address: Central Inland Fisheries Research Sub-station, Cuttack, Orissa.

while in the other (Experimental) their entry was allowed. During the low tide some of the water was drained out through filters and the process was repeated every day for a period of two weeks so as to ensure a good stock of prawns in the experimental plot and to maintain similar water conditions in both. *Tilapia* fingerlings ranging in length 36-80 mm were stocked in both the enclosures in equal numbers at a rate of approximately 4800/ha. The fishes were sampled every month and an analysis of gut contents was carried out to ensure whether they were feeding on prawns. After a period of three months the entire stock of fish and prawns was netted and the total number and weight assessed.

The size-frequency distribution of *Tilapia* is shown in Table 1. It is found that during the early part of the experiment, heavy mortality took place, especially among the smaller size groups. The percentage of recovery at the end of the experiment was 18.7 in the experimental plot and 13.75 in the control. The weight of fish obtained from the experimental pond was 5 kg and that from the control 3.4 kg which work out to 100 kg and 68.0 kg/ha respectively. The prawns in the experimental pond weighed 10 kg (200 kg/ha).

The species and size composition of the prawns were similar to those of the catches from the adjoining paddy fields and their growth was also similar. The data are presented in Table 2.

An analysis of the gut contents of *Tilapia* did not give any indication of its feeding on prawns or their post-larvae. They were found to consume a variety of diatoms such as *Coscinodiscus*, *Pleurosigma*, *Chaetoceros*, *Amphora*, *Diploneis*, *Cocconeis*, *Navicula*, *Mastogloea* etc. in addition to large quantities of organic debris. Zooplankton was practically absent in the guts.

The fishes in the control tank showed slightly better growth than those of the experimental one at the end of the experiment. The size frequency data when statistically analysed showed highly significant difference between the two. This may probably be due to the mortality of some of the larger specimens in the control. The loss in numbers was really large in both the plots. It was more so in the control. Predation by birds was also common and a greater loss in the control might be due to its shallow depth (average 28 cm) than that of the experimental part (30.5 cm). Very often *Tilapia* and prawns of various sizes were seen swimming side by side without causing any undue disturbance to each other. If alarmed by the movements of the fish the prawns darted away throwing a cloud of mud. Salinity in the enclosures ranged between 6.75 ‰ and 21.06 ‰ during the period of the experiment.

As noted above the production of *Tilapia* and prawns from the present experiment conducted for a period of three months was 100 kg and 200 kg/ha respectively. But the fact that this was achieved without any fertilization or artificial feeding and without the prawns being trapped and filtered as in the commercial

TABLE 1. *Size frequency of* Tilapia *in experimental and control sections of the enclosures*

Date	Size groups mm	31-40	41-50	51-60	61-70	71-80	81-90	91-100	101-110	111-120	121-130	131-140	141-150	151-160	161-170	171-180	181-190	191-200	Total No. of fish
22.1.1959	Expt.	49	82	57	34	18													240
	Control	49	82	57	34	18													240
28.2.1959	Expt.			3	4	4	10	14	6	1									42
	Control				3	2	9	4	10	5	1								34
6.4.1959	Expt.							1		3	4	13	7	3	6	5			42
	Control					1	1	1	3	5	7	12	4	1	1				36
24.4.1959	Expt.										1	2	9	10	5	5	8	1	41
	Control									1	3	10	5	6	5		1		31

TABLE 2. *Species composition, size range and dominant size of prawns in the paddy field*

	% by weight	Size range mm	Dominant size mm
Initial			
M. dobsoni	73.7	25— 54	35—39
P. indicus	13.3	22—115	25—29
M. monoceros	12.9	27— 91	
Final			
M. dobsoni	72.7	35— 59	45—49
P. indicus	18.4	25—124	45—49
M. monoceros	8.8	38— 79	

practice, indicates a good scope for making *Tilapia* a secondary crop in prawn fields. Moreover, it was found that both prawns and *Tilapia* were quite healthy and they did not seem to affect the growth of each other. Therefore, it is suggested that if *Tilapia* fingerlings of 50 - 60 mm are stocked in prawn-cum-paddy fields at the beginning of the prawn season, fish of good marketable size could be obtained at the end of the season. In three months *Tilapia* attained an average length of 162 mm in the present experiment, i.e. approximately 8-10 fishes will be of 1 kg in weight. So in the 6-month duration (November to April) which is the usual prawn fishing period they can be expected to reach a much larger size. Some bamboo grills or wide-meshed net could be used at the ends of the drainage channels which lead to the sluice gate, to prevent *Tilapia* from escaping at the time of the entry of water and during fishing. The repeated changes of water will bring in more food material for the fish, thereby increasing their rate of growth. The observation of George *et al.* (1968) that short-term culturing of prawns in paddy fields is more lucrative than the usual practice of filtration, as it gives larger prawns, is of significance in this context, as this method provides the introduction of *Tilapia* also. The deeper areas, like the drainage channels, present in all paddy fields can provide a good hiding place for the fish while a part of the water is usually drained out during fishing.

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