Small-Scale Fishery of Pichavaram Mangrove Swamp, Southeast India

V.S. CHANDRASEKARAN
R. NATARAJAN

Abstract

A description of the small-scale fishery of Pichavaram mangrove, southeast India is given, with emphasis on catch composition, catch per effort and deployment of various gear types.

Introduction

Pichavaram mangrove swamp (11°27'N; 79°47'E) is located about 200 km south of Madras city on the southeast coast of India; it consists of small and large islets covering an area of 1,100 ha (Fig. 1). It is one of the typical mangrove swamps of India, with a high productivity of about 8 t of organic plant detritus ha/year. This mangrove swamp, like many others, acts as nursery for the juveniles of commercial species of fishes, as already stressed by many workers (Snedaker and Lugo 1973; Linden and Jernelov 1980). This contribution is an attempt to describe the fisheries operations and the exploited resources of Pichavaram mangrove.

Materials and Methods

Fish landings were sampled biweekly from April 1981 to March 1982. Total monthly catches were estimated from information on daily fish landings as obtained from interviews with fishers, for major categories such as mullets, prawns, crabs, etc. The size observations, derived from random samples of commercial catches, refer to total length (from tip of the rostrum to tip of the telson resp. from tip of snout to tip of caudal fin lobes) for prawns and finfishes, and to carapace width for crabs.

Results and Discussion

Species and size composition of the catch

Monthly catches for different species/groups of finfish and shellfish and their percentage composition are given in Table 1. Twelve species of prawns contributed over 80% of the total catch; among these *Metapenaeus monoceros* ranked first (30%) followed by *Penaeus indicus* (18%) and *M. dobsoni* (17%). The tiger prawn *P. monodon* constituted 2.6% of the total catch and was captured only from August to February. Freshwater prawns (*Macrobrachium* spp.) formed 1.8% of the total catch and appeared only during the monsoon and early postmonsoon (September-January), when salinities were very low. *Metapenaeus affinis, M. brevicornis, Penaeus merguiensis, P. semisulcatus* and *Palaemon* spp. formed the remaining portion (12.2%) of the prawn catches.

The crabs belonged to three species (*Scylla serrata, Portunus pelagicus* and *P. sanguinolentus*) and formed 4.1% of the total catch; of

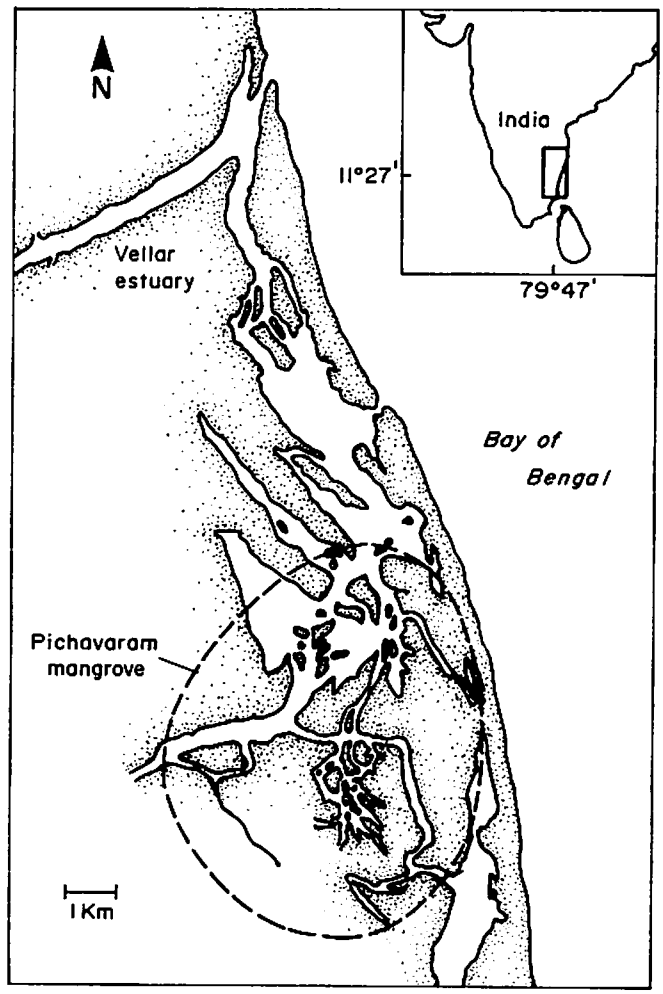

Fig. 1. *Pichavaram mangrove and surrounding area.*

this, subadults and adults of *S. serrata* constituted over 90%.

The finfishes were represented by 58 species. The contribution of mullets represented 7.1% of the total catch and 47.9% of the total finfish catch. The most common mullets identified were *Mugil cephalus, Liza dussumieri, L. macrolepis, L. tade* and *Osteomugil speigleri*. The catfishes were represented by *Tachysurus thalassinus, T. arius* and *Mystus gulio*; other finfishes occurring in the catches were *Chanos chanos, Pomadasys hasta, Leiognathus* spp., *Ambassis gymnocephalus, Siganus javus, Etroplus suratensis* and *Cynoglossus puncticeps*.

The range of size measurements, representing the pooled data of size of individuals obtained at every month from all types of gears mentioned below, are also given in Table 1.

Catch, effort and gear deployment

The total catch estimated for the one-year period (April 1981 - March 1982) was 200 t. Estimated number of important gears, their catches, catch per unit effort (CPUE) during this period and the mean annual CPUE are given in Table 2.

The gears operated in this area can be broadly classified into: i) cast net, ii) drag net, iii) stake net, iv) gill net, v) crab trap and vi) hook and line. Apart from these, hand picking of prawns and catching (filtering) fish juveniles with fine cloth by wading in shallow water is also practised by a local community called "Vedars". However, the dugout canoe is the most popular and versatile craft used for fishing in this mangrove.

Stake nets ("Oonu valai"), which had the highest CPUE, are operated along four to six specific areas in the main channel of the mangrove. At each point, four wooden poles are driven into the mud in a straight line across the middle part of the channel, leaving some space on either side, close to the banks, in order to avoid blocking the channels for regular traffic of canoes. Each net is tied to two poles, and three nets are operated at each point, mounted to the poles at the beginning of low tide and removed along with the catches just before the start of high tide.

Each crab trap unit consists of 40-50 traps tied in a single long rope, one after another, at an interval of about 1.5 to 2 m. The traps consist of a circular iron ring fitted with a nylon bag and are suspended in the water using a float (usually a small wooden block) for each trap. Fish meat (usually decayed flesh of rays) is used as bait and is kept hooked inside the bag of the trap. The traps are released serially in water to a distance of nearly 100 m, keeping one end to float with a wooden block attached to it. Every 2-3 hours, each trap is carefully pulled up and the crabs in the bags are collected. A canoe is used for the above operation which is repeated in different areas of the mangrove. Such operations take place at least 3-4 times a day.

Table 1. Monthly catches (kg) and sizes in the catches of different species/groups of shellfish and finfish from Pichavaram mangrove (India), April 1981-March 1982.

Species/group	Size range (cm)	1981 Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	1982 Jan	Feb	Mar	% of Total
Penaeus indicus	3-10	1,891	2,130	2,263	2,666	2,880	3,224	51,000	4,619	3,751	1,260	2,449	2,910	17.6
P. monodon	3.3-12	-	-	-	-	930	-	1,950	434	899	420	496	-	2.6
Metapenaeus monoceros	2.4-8.9	4,805	3,330	5,642	4,526	4,470	5,979	9,060	7,006	5,518	560	2,821	5,460	29.5
M. dobsoni	2.6-9.7	3,162	2,490	2,542	2,728	3,000	2,077	4,380	5,239	3,503	336	1,953	3,270	17.4
Macrobrachium spp.	2.5-8.6	-	-	-	-	-	496	1,020	1,395	651	112	-	-	1.8
Miscellaneous prawns	3.2-11.6	2,604	1,530	3,503	1,736	1,500	1,178	1,050	2,418	2,511	1,624	2,573	2,070	12.2
Crabs	8.6-16.4	248	420	496	8,668	1,830	713	900	1,023	496	168	744	240	4.1
Catfishes	6.4-11	-	-	-	93	60	-	150	62	93	-	62	-	00.3
Sciaenids	8.5-14.6	-	-	-	-	-	-	270	-	93	84	-	-	0.2
Sillago sihama	6.2-16.5	-	-	-	-	-	-	150	-	-	-	-	-	00.1
Miscellaneous fishes	5.8-15.6	1,240	1,140	1,240	1,147	120	186	2,160	1,798	2,170	616	961	1,530	7.2
Total	3-16.5	13,950	11,520	15,686	14,787	17,580	15,066	74,310	27,391	20,274	5,432	12,431	16,620	100

Table 2. Estimated number of important gears (with mesh size range in cm), their catch (in kg) and catch per unit efforts (CPUE) from April 1981 to March 1982.

	Apr	May	Jun	1981 July	Aug	Sep	Oct	Nov	Dec	1982 Jan	Feb	Mar
Cast net (1.2-6.0)												
Catch	2,790	2,160	3,441	3,596	5,580	4,247	9,990	7,626	5,580	2,072	2,635	3,060
No. of units	1,860	1,920	1,953	2,046	1,950	1,953	2,550	2,697	2,232	1,624	1,953	1,680
CPUE	1.5	1.1	1.8	1.8	2.9	2.2	3.9	2.8	2.5	1.3	1.3	1.8
Drag net (1.0-3.8)												
Catch	2,449	2,220	5,673	5,921	5,880	6,789	8,280	7,378	7,205	616	5,394	6,510
No. of units	1,147	1,050	1,054	837	1,050	750	558	837	616	868	1,050	10,871
CPUE	2.1	2.1	5.4	7.1	5.6	9.0	14.8	8.8	11.7	0.7	5.1	0.6
Stake net (1.5-2.0)												
Catch	7,905	6,210	5,332	3,441	4,290	2,914	7,710	11,284	5,394	1,792	2,325	6,150
No. of units	868	840	837	775	900	930	930	1,165	837	644	589	630
CPUE	9.1	7.3	6.3	4.4	4.7	3.0	8.0	10.0	6.4	2.7	3.9	9.7

The drag nets ("Illupu kovalai") are operated in shallow (waist-deep) waters. Each net is approximately 10 m in length, supported by five bamboo poles and intermittently dragged, by their cod ends, by two men, for a distance of about 50-70 m. The catches are collected in earthen pots, kept afloat and tied to the waist of one of the operators.

"Vela valai" is a type of gill net measuring about 100 m in length and suspended with floats and sinkers; hand cast nets of different mesh sizes are also used by the fishers, either from a canoe or standing in waist-deep waters. The drag nets and stake nets are operated only at night time while the crab traps and the hook and line ("Thoondil") are operated only during the daytime. The cast nets and gill nets are operated both day and night. Operation of "Kuzhi valai" (another type of drag net) and hook and line are occasional and seasonal.

Recommendations for Management

The data at hand indicate that most of the fish caught in Pichavaram mangrove are juveniles, caught with small mesh gears and the incomes derived from the sale of these fishes are very low. However, management of small-scale fisheries such as described here is extremely difficult and I shall abstain to discuss this topic here, except for mentioning: i) the "Padu system" of allocating fishing rights to fishers of different localities, and which may reduce the effects of competition (Krishnan and Sampath 1976), and ii) the possibility of stocking low lying areas of the mangrove with juvenile fish or prawn.

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V.S. CHANDRASEKARAN *and* **R. NATARAJAN** *are from the Centre of Advanced Study in Marine Biology, Annamalai University, Parangipettai 600 502, Tamil Nadu, India.*