



Shore seine fishery along Poovar in Thiruvananthapuram district, southwest coast of India

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Short Communication

Abstract

This study deals with seasonal variation in species composition of commercially important fishery resources caught by shore seines along Poovar in Thiruvananthapuram district, south west coast of India. The estimated annual average fish landings by shore seines amounted to 22.5 t caught at a catch per unit (CPU) of 74.17 kg and catch per hour (CPH) of 18.54 kg during August 2012 to September 2014. The fishery, mostly represented by fin fishes (99%) comprising of 43 species belonging to pelagic and demersal groups, was dominated by sardines, anchovies and silver bellies. The peak fishing season was observed as post-monsoon contributing 54% of total fish landings, followed by pre-monsoon and monsoon seasons. A detailed study on the species composition with their size distribution was carried out for the first time from Poovar. The deleterious impact of shore seine operation on account of exploitation of bulk catches of juveniles of commercially valuable fishery resources is discussed along with suitable suggestions for proper management of the fishery.

Keywords: *Shore seine, Poovar coastal waters, exploited species, juveniles, spawners, size frequency distribution*

Introduction

Poovar is a traditional fishing centre situated in Thiruvananthapuram district of Kerala along the south west coast of India where shore seine operation is an important fishing activity. Shore seines, locally known as "Karamadi" or "Kamba vala", are operated using canoes, catamaran and by fiberglass boats (8.5 to 11.0 m L_{OA}) at 5 to 7 m depth within 0.5 km to 3 km from the sea shore. Shore seines are traditional, non selective, near shore based active fishing gears made up of mono filament nylon twines. Shore seines in different local names have been used in India for over a century by traditional fishermen targeting coastal fish population. Detailed account on the structure, mode of operation, and economics with fishery details is available (Seshagiri Rao, 1987, Sam Bennet and Armugam, 1993, Swathi Lakshmi *et al.*, 2014; Sathiadhas and Narayanakumar, 2002; Salagrama, 2008; Tietze *et al.*, 2011). Presently a total of 2,227 numbers of shore seines in different local names are operated along east and west coasts of India, such as Maharashtra, Gujarat, Andhra Pradesh, Karnataka, Goa, Puducherry, Tamil Nadu and Kerala (CMFRI, 2010).

Material and methods

The study was carried out for 2 years from Poovar, south west coast of India during October 2012- September 2014.

Data were collected regularly once in a fortnight during the period. Season wise data on fishery resources, catch rates per unit and hour, species composition, juvenile and spawner composition, including size frequency distribution of dominant species were analyzed. Using the raising factor N/n where 'N' is the number of units operated on the day and 'n' is the units observed, total weight of the resource on the sampling day was estimated on the basis of sampling units. The monthly estimates were arrived by raising the estimated resource on the observation days to the number of fishing days in the particular month. Total month wise effort and catch was thus estimated. Size frequency data collected on dominant species were grouped into 5 mm size class intervals to study size composition, mean size, maturity and sex ratio. Maturity stages were determined based on visual observation on the condition of ovary of the representative samples of female specimens of fin fish, cephalopod and crustaceans in the laboratory. In fishes, gonad development was determined based on 7 stages such as immature (I), developing immature and spent recovering (II), maturing or early mature (III), mature (IV), advanced mature (V), fully ripe (VI), partially spent (VIIa) and fully spent (VIIb). Stages of gonad were identified based on the appearance, color, size, blood vessel distribution, and maturity of the ova. The total length of the each specimen was measured to 1mm accuracy. Season wise pooled data was used to determine peak fishing season, spawning season as well as juvenile recruitment season.

Results

Gear

The shore seines are made of nylon netting and composed of a bunt (bag), where catch is concentrated, and long wings lengthened with long ropes for towing the seine to the beach. The netting in the lower portion of the bag is of 6 mm mesh size and lower edge of the bag was about 20 m in length. The top edge of the bag is about 15 m in length and mesh size varied from 20 mm to 30 mm towards the mouth. The wings on either side of the bag are 600 to 900 m in length and nylon towing ropes of 200-250 m are attached to the wings.

Fishing operation

The gear after loaded into the vessel, and before leaving the shore, one of the towing ropes will be handed over to a group of fishermen on shore. The vessel then make a semi-circular course while shooting the net and as soon as the vessel reach the shore, the remaining towing rope will be handed over to the second group of fishermen. The two groups comprising 20 to 40 numbers of fishermen on the shore haul the net simultaneously. Meanwhile three to four fishermen make

splashes in order to drive the fishes, towards the gear. As the hauling progresses, the two groups of fishermen on the shore come closer together and the gear is dragged ashore. Shore seine operation is carried out usually in the morning and will take around 4 hours, after a shoal is sighted.

The estimated annual average fish landings by shore seines amounted to 22.5 t caught at a catch per unit (CPU) of 74.17 kg and catch per hour (CPH) of 18.54 kg (Table 1). The fishery was mostly supported by fin fishes (99%) represented by 22 families with 26 pelagic and 14 demersal species. The dominant groups of fishes belonged to the family Carangidae with 9 species, followed by Clupeidae (6 species), Engraulidae (3 species) and Leiognathidae (3 species). Remaining groups were represented by penaeid prawn, *Fenneropenaeus indicus*, cephalopod, *Loligo duvaucelii* and jelly fishes. Maximum species diversity was observed during post-monsoon period (35) followed by pre-monsoon (20) and monsoon (16) (Table 2). Season wise fish landings are given in Fig.1. The fishery was dominated by *Stolephorus indicus* (33.2%), *Sardinella longiceps* (31.1%), *Encrasicholina heteroloba* (13.2 %) and *Leiognathus lineolatus* (8.1%) contributing 85% of total fish landings. Season-wise details on dominant species are given in Fig. 2. During the post monsoon season, out of 37 species landed, 13 species were formed by juveniles of commercially important species contributing 76.7% of total fish landings (Fig. 3). In October, entire catch of *S. longiceps* and *Secutor insidiator* and during December, 65% of *Sillago sihama* and 7% *E. heteroloba* were formed by spawners.

Table 1. Season-wise catch and effort of shore seines at Poovar during October 2012 to September 2014

Season	No. of units	Fishing hours	Catch	CPU	CPH
			(t)	(kg)	(kg)
Post -monsoon	230	920	24.1	104.87	26.22
Pre-monsoon	329	1316	17.2	52.34	13.09
Monsoon	49	196	3.8	79.06	19.77
Total	608	2432	45.1	74.3	18.58

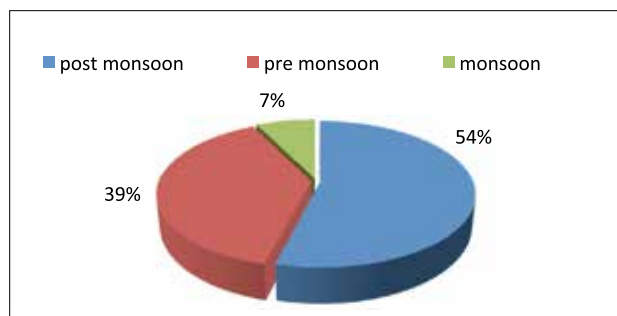


Fig.1. Season wise fish landings (%) by shore seines at Poovar during October 2012 to September 2014

Table 2. Season wise size range (mm) of different species caught in shore seines at Poovar during October 2012 to September 2014

Species	Pre monsoon	Monsoon	Post monsoon	Family
<i>Ambassis urotenia</i>	N c	N s	N c	Ambassidae
<i>Apogon lineolatus</i>	N c	N c	30-62	Apogonidae
<i>Athryna boyeri</i>	60-75	N d	N c	Atherinidae
<i>Alepes kleinii</i>	N c	N c	40-123	Caranjidae
<i>Atule mate</i>	89-98	N d	131-174	Caranjidae
<i>Alectis indicus</i>	N c	N c	Ns	Caranjidae
<i>Caranx sexfasciatus</i>	N c	N c	45-60	Caranjidae
<i>Carangoides malabaricus</i>	208-212	N d	N c	Caranjidae
<i>Decapterus russelli</i>	N c	N c	82-145	Caranjidae
<i>Decapterus macrosoma</i>	N s	N c	Ns	Caranjidae
<i>Megalapsis cordyla</i>	48-52	171-80	N c	Caranjidae
<i>Selar crumenophthalmus</i>	N c	N c	44-74	Caranjidae
<i>Chirocentrus dorab</i>	N c	N c	80-90	Chirocentridae
<i>Amblygaster sirm</i>	N c	N c	163-185	Clupidae
<i>Dussumeria acuta</i>	N c	N c	169-190	Clupidae
<i>Pellona ditchella</i>	N s	N s	N s	Clupidae
<i>Sardinella fimbriata</i>	N c	N c	108-153	Clupidae
<i>Sardinella longiceps</i>	N c	N c	70-177	Clupidae
<i>Sardinella gibbosa</i>	40-55	N d	N c	Clupidae
<i>Cynoglossus sp.</i>	N s	N c	Ns	Cynoglossidae
<i>Encrasicholina heteroloba</i>	55-88	N c	46-95	Engraulidae
<i>Stolephorus commersonii</i>	N c	N d	54-95	Engraulidae
<i>Stolephorus indicus</i>	63-100	N d	72-148	Engraulidae
<i>Thryssa setirostris</i>	48-70	N c	N d	Engraulidae
<i>Fistularia petimba</i>	430-450	N c	152-165	Fistulariidae
<i>Gazza minuta</i>	20-40	N c	35-63	Leiognathidae
<i>Leiognathus lineolatus</i>	82-100	N d	17-91	Leiognathidae
<i>Secutor insidiator</i>	N c	N c	N s	Leiognathidae
<i>Loligo duvauceli</i>	37-110	N d	38-135	Loliginidae
<i>Lutjanus lutjanus</i>	N c	N c	N s	Lutjanidae
<i>Mene maculata</i>	N c	70-240	N c	Menidae
<i>Aluterus monoceros</i>	N c	Ns	N c	Monacanthidae
<i>Mugil cephalus</i>	158-177	N c	N d	Mugilidae
<i>Fenneropenaeus indicus</i>	N c	170-198	N c	Penaeidea
<i>Auxis thazard</i>	N c	N c	133-170	Scombridae
<i>Rastrelliger kanagurta</i>	89-150	225-302	170-195	Scombridae
<i>Epinephelus diacanthus</i>	N c	N c	45-80	Serranidae
<i>Siganus canaliculatus</i>	N c	N c	45-60	Siganidae
<i>Sillago sihama</i>	Ns	N c	140-170	Sillagnidae
<i>Sphyaena obtusata</i>	80-91	N c	40-100	Sphyaenidae
<i>Sphyaena borealis</i>	N c	N c	18-30	Sphyaenidae
<i>Pelatesqua drilineatus</i>	N c	N c	73-99	Therapontidae
Jelly fish	N s	N s	N s	0
Total	20	16	35	22

N c: No catch; Ns: Not studied; Pre-monsoon: Feb-May; Monsoon: Jun-Sep; Post-monsoon: Oct-Jan.

Discussion

The present study revealed that shore seine fishery is

multispecies contributing 54 % of total fish landings during post monsoon, followed by 38.6 % in pre-monsoon and 7.4% in monsoon. Low fish landings observed during monsoon

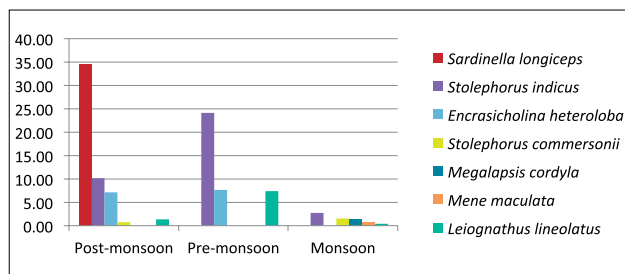


Fig.2. Season wise dominant species caught (%) by shore seines at Poovar during October 2012 to September 2014

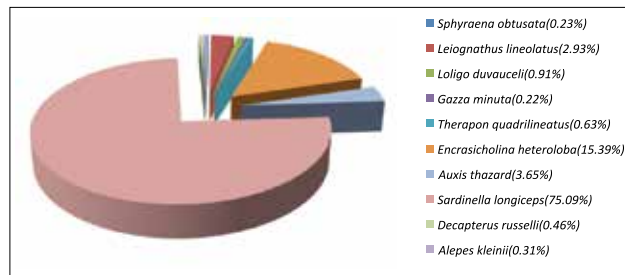


Fig.3. Percentage composition of juveniles in total fish landings by shore seines during post monsoon at Poovar

season is attributed to the strong wind and water currents and resultant difficulties in fishing. Although 54.5 % of the species caught was small sized and economically low value fish, juveniles of commercially valuable large pelagic species such as *Auxis thazard*, *Caranx sexfasciatus*, *Alectis indicus* and *Sphyræna borealis* were also observed. This study also shows that 76.7% of total fish catch during post monsoon was formed by juveniles which is a matter of serious concern.

In view of high economic loss encountered due to the removal of juveniles from the fishing ground before attaining marketable size, present study suggests to derive a strong data base supplemented with experimental fishing studies using different cod end mesh size ranging from 18 to 25 mm during post monsoon, monsoon and pre monsoon season. Implementation of management measures such as regulations in numbers and dimensions of the gear especially during post monsoon season is recommended. Provisions for livelihood alternatives for the stakeholders also should be charted out.

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