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STATUS OF THUKRINET FISHERY FROM DAMB FISH HARBOUR, SONMIANI BALOCHISTAN COAST, PAKISTAN

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ABSTRACT: Thukri net is basically a bottom set drift net, widely operated for shrimp catching along the coastal waters of Sindh and Balochistan provinces, creeks of Indus delta, Sonmiani bay and nearby shallow coastal areas. The field investigation was done for two fishing seasons) from 15th August, 2008 to 15th April 2009, and from 15th August 2009 to 15th April 2010. The catch rate of shrimp varied from 0.50kg/net/day to 7.50kg/net/day.

Maximum catch 7.50kg/net/day was recorded in September 2008 and minimum 0.50kg/net/day in April 2009. The maximum catch of fishes (by-catches) was (3700kg/net/day) in September, 2008 and minimum was (12kg/net/day) in April, 2009. The average catch was 462.2kg/month and 4159.8kg/year in 2008-2009. The Thukri net catch of shrimp were about 779.40kg/boat/year and about 830kg/boat/year during 2008-2009 and 2009-2010 respectively and the finfishes were 4160kg/boat/year and 4779 kg/boat/year during the same period.

KEYWORDS: Thukri net fishery, Damb fish harbour, Sonmiani, Balochistan coast.

INTRODUCTION

Pakistan is situated in the northern part of the Arabian Sea, extending along the coast at 61°30'E in the west to Indian border at 68°10'E in the east. The coastline is about 1120km along the Arabian Sea. The territorial water extends from the coast up to 12-nautical miles. Beyond this there is an Exclusive Economic Zone (EEZ) between 12-nautical miles and up to 200-nautical miles (370km). The EEZ of Pakistan is about 240,000sq.km with continental shelf area is about 50,270sq.km. The total maritime zone is about 30% of the land area (Raza, 2001). In addition the total marine water resources of Pakistan are estimated to be about 600,000mt/year, out of which inshore waters are 500,000mt/year and offshore water (EEZ) are 100,000mt/year approximately. The coast of Balochistan is about 800km long and lies west of Karachi between longitude 61°37' and 68°12'E and latitude 25°00' and 25°30'N. The coast line is rugged and irregular, and runs east-west bordering the productive North Arabian Sea.

Balochistan has considerable potential resources for the development of fisheries sector. Balochistan has an area of 69% contributing only 30% of fish production. Extremely little is known about the composition and distribution of marine fauna and flora of the coast. Relatively few research studies have been made on Balochistan coast, although it constitutes the major part of the coast of Pakistan mentioned by the following

authors (Qureshi, 1955; Zupanovic and Mohiuddin, 1973; Tirmizi, 1980; Ahmed, 1982; Thompson and Tirmizi 1988; Hassan, 1981; Majid, 1988; Qureshi, 2002; Gondal *et al.*, 2006). The distribution, abundance and taxonomic studies of the marine animals of Balochistan coast (were studied by Saifullah, 1993 and Saifullah and Rasool, 1995). The satellite and remote sensing survey was done by (Mirza *et al.*, 1988 and Rasool *et al.*, 2002). The Geology, minerals and Hydrocarbon resources were discussed by (Memon, 1977; Kazmi and Jan, 1997 and Qasim, 1982).

The marine resources of Balochistan have not been fully exploited except for fish. Mangroves in Balochistan covers an area of 18,350 hectares (Mirza and Rangoonwala, 1988) along the 733 km coastline and is confined only the area of Sonmiani that covers 41% of the total mangrove areas. The mangroves are the principal component of the ecosystem around three areas of Kalamat, Khor and Jiwani. They provide nutrients, shelter and breeding grounds, especially to shrimp and other marine animals. The total fish production of Balochistan shows a steady increasing trend during the period from 1991 to 2002. The production increased from 10708 metric tons to 12300 metric tons in 2000. The rate of increase was 1.47% per year. In the year 2000 fish and fishery products were exported to 84693 metric tons with an exporting value of Rs.7.878 billion (Raza and Khan, 2001). Administratively the Sonmiani is one of the Tehsils of Lasbela District in Balochistan. The district is situated in the southern coast of Balochistan and the research area consists of four towns/villages. The largest and most important is Damb Bunder followed by Sonmiani, Bhira and Balochi Goth. Around 90% of the population is dependent on fishing or fisheries related business and others to alternative means of income. The fishing season lasts for eight and half months which provide earning opportunities to the fishermen. During off-season the fisher-folk communities face financial tensile. This data (Table 36) was taken from the local CBOs.

The main goals behind the collection of vital information are about the fishermen community of Sonmiani, their socio-economic conditions and poverty level about their livelihood resources and to develop a comprehensive and critical analysis of the entire fish marketing system. The study was involved with local stakeholders to find out the information regarding the economic situation of fishermen, and their income, expenses and indebtedness. The study also paved the way to develop strategy for intervention, their economic condition of the fishermen-community of Sonmiani and to suggest sustainable livelihood intervention approach for fishermen community of Sonmiani. In order to achieve the above objectives, the research took into account the following aspects of fishermen community of the Sonmiani:

- i. Current income, expenditure and debt status of the fishermen.
- ii. Kind of issues which affecting the fishermen.
- iii. Fish value/supply/marketing system.
- iv. Role of various elements within the supply system, their incomes, costs and profits.
- v. Find out the role and profit level of middlemen.
- vi. Suitable intervention based on other experiences, including proposed fisheries policy for Balochistan, prepared by CARD (Coastal Association for Research Development) at Sonmiani, being a part and member of the advisory committee for preparation of the fisheries policy for Balochistan.

Thukri net is one of the most frequently used fishing nets in the Balochistan Coast. This net has been used for the collection of fin fishes and shell fishes in the Sindh Coast. So considering its importance, a detail description of this gear and its catch is provided in this study. The present study aims also to give the statistical data analysis of samples collected by Thukri Net from Damb harbor, Sonmiani Balochistan coast.

MATERIALS AND METHOD

Study area:

The Sonmiani (Miani Hor) is a lagoon, which is situated at about 10km north-west of Karachi and on in the eastern most part of the Balochistan coast between $25^{\circ}35'N$, $66^{\circ}20'E$ (Fig. 1). It is 50 km long and 7 km wide contorted body of water which is connected to the sea by a 4km wide mouth. The average width of the lagoon is 7km. Water temperature in the lagoon ranged from $22-39^{\circ}C$ and salinities from 31-41‰ (Ahmed and Ayub, 1996, Ahmed and Abbas, 1999). Two seasonal rivers enter the lagoon: one from northern side, Porali River that empties into the central part whereas the other one from the eastern side, Winder River that enters near the mouth of the lagoon. Sonmiani is one of the important fish landing center that comprises of three villages.

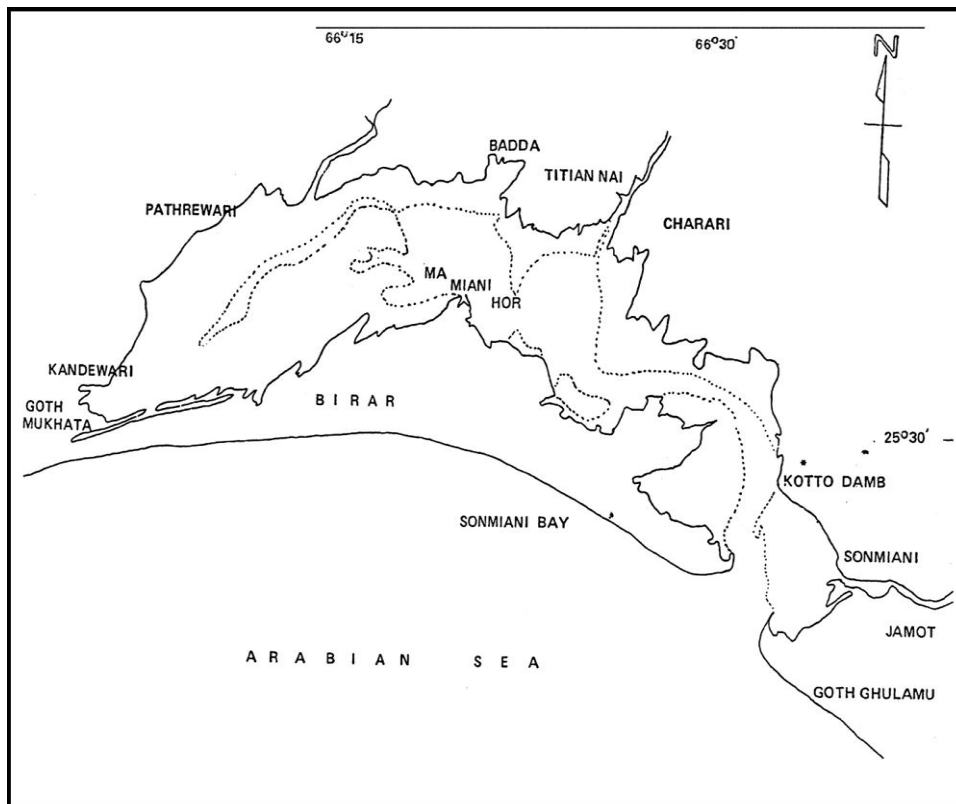


Fig. 1. Study area Map.

In 1961 Sonmiani had approximately 400 permanent residence and 200 structures; most of the structures are dilapidated. Damb has population of about 200 and 150 clay shacks and that Clayed huts (Snead, 1969). Water and food are unsanitary at both these settlements. Buses and Trucks can reach in these Towns during rough weather, but the roads are hardly more than sand tracks across migrating dunes. Most of the fish caught and brought to Damb by boat, are slipped to Karachi by trucks. There are a total of about 40-50 small sitting crafts beached at Damb (Snead, 1969).

Sampling:

Biological sampling and economic survey were done for two fishing seasons from 15th August, 2008 to 15th April 2009, and from 15th August 2009 to 15th April 2010 following the lunar calendar. There was no fishing on the scheduled sampling days in May, June and July due to rough weather condition and close season of ban period, imposed by the Directorate of Fisheries, Govt. of Balochistan.

Species identification:

The following authors were consulted for identification of fishes (Bianchi, 1985; Munro, 1955; Qureshi, 1955 and 1961; Hoda, 1988; Nelson, 1984 and 2006; Smith and Heemstra, 1996) and for shrimp (Tirmizi and Bashir, 1973) and for crabs (Tirmizi and Kazmi, 2003 and 2006).

Thukri net fishery:

Thukri net is basically a bottom set drift net and is widely used to catch prawn in both Sindh and Balochistan provinces, in creeks near Indus delta, near Sonmiani bay and in other shallow coastal areas of Pakistan. Thukri net is prepared or rigged by local fishermen from machine braided nylon (pa) netting, multifilament netting (mesh sizes of 32-57 mm) of white color made from twine number 210 d/2 (r-46 tex) and monofilament netting (mesh sizes of 32 mm-57 mm) available in different twine diameters such as 0.18 mm, 0.20 mm and 0.23 mm of blue and green color. Earlier multifilament net was used but since monofilaments is cheaper and proved to be more efficient, fishermen now prefer this type of net. Eight to ten netting sheets are joined together to form a single unit of a Thukri net. Each netting (one sheet) is of 100 yards (91 meters) in length by 80 meshes in depth. The hanging ratio is usually set at 0.5, which makes availability of half of total length of the net for fishing.

Mesh size may vary according to fishing ground and target species. Mesh size of 50 to 57 mm are used to target large species (Jaira and Kalri) and mesh size of 32-38 mm for small and mix size species. A typical Thukri net has five units (5x10) and length of a single unit is 455 meters (E= 0.5) by 80 meshes in depth. Netting made up of monofilament nylon (PA) twine of 0.23 mm diameter is used in net construction. Stretched mesh size is 38 mm and hanging ratio was 0.5. Length of float line and lead line is equal of 455 meters and made up of plastic (PE) and resham (PA), respectively. Float line of 6 mm in diameter and lead line of 8 mm is used. A piece of PVC float (flat ball shape) is attached at 2-meters distance and lead of 50 gm (sinker) is embedded at every 0.5 meter.

Thukri net is operated manually from small to medium size vessel - Hori, Hora and Dhonda boats. A small boat (16-22 ft) with 2 to 4 crew on board usually carry 2-4 units of net at a time and a medium boat (25-35 ft) with 5 to 8 crew on board can carry 5-8 units of Thukri net. The gear is set over the side of board and lowered into the sea by two

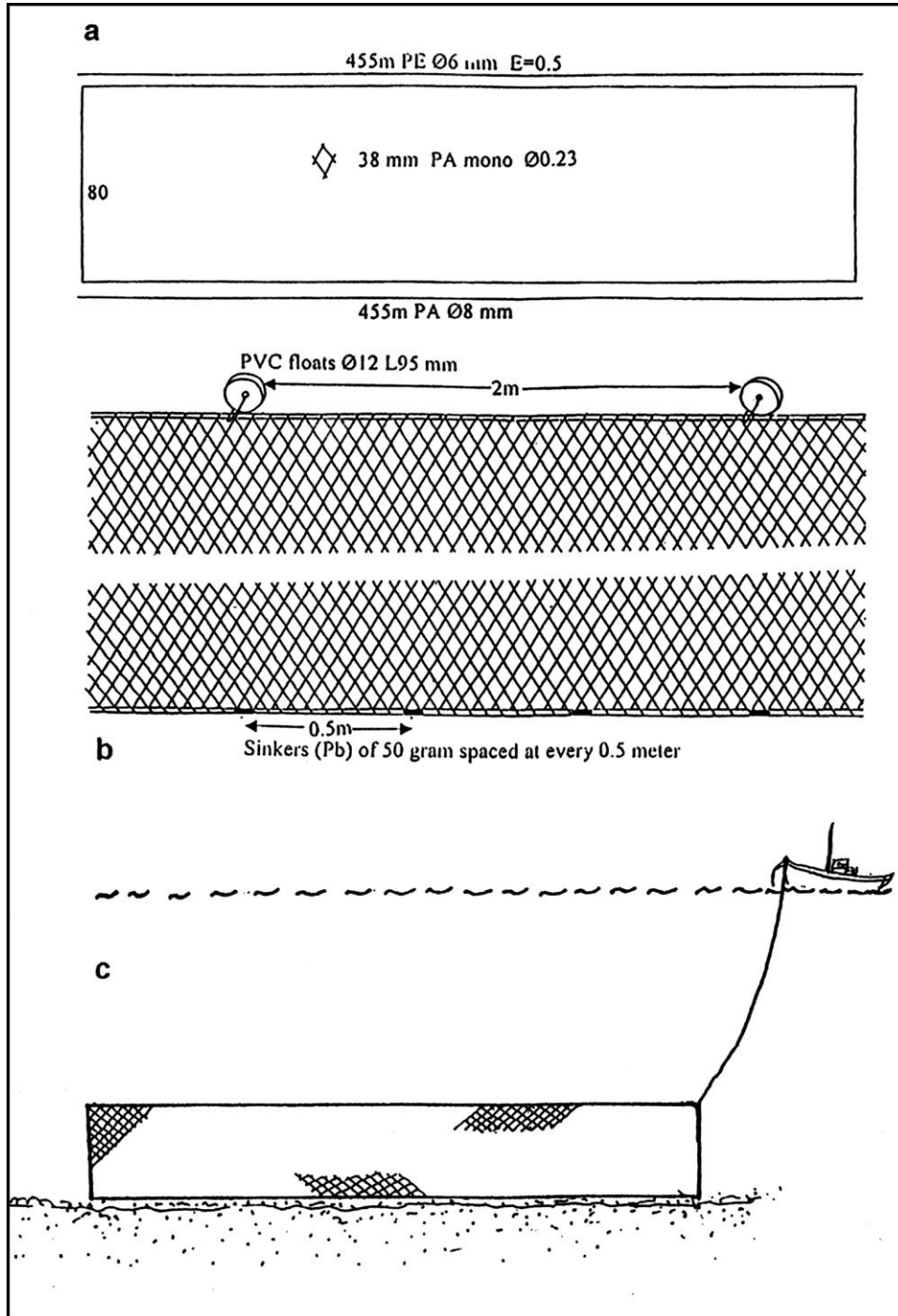


Fig. 2. Thukri Net.

fishermen and is tied to boat to drift close to bottom with water currents. Net is hauled after half or an hour. This practiced is continued till enough catch is made. Usually 2 to 4 fishermen operate the net using small crafts, and daily catch is brought to market. The Thukri net is operated through large craft with a crew of 4-8 normally spend 2-5 days at fishing ground (Fig. 2). Thukri is operated throughout the year except May, June and July; however, the Thukri net fishery is more productive from August to December. The Thukri net fishing is mainly confined within the Sonmiani, where the fishing centers like, Hadi, Wanti, Bhera, Hen, Ken and Duni are close to each other (Fig.). However, during winter when sea is calm, crafts are also operated outside the lagoon, but they prefer to fishing near the Sonmiani Bay at Kurputti, Wadibander and Zeree fishing centers.

RESULTS AND DISCUSSION

Catch composition:

Shrimps: About 24 species of penaeid shrimps in 7 genera have been reported from the coast of Pakistan, broadly categorized by the fisher-folk into three groups. Several fisheries workers in Pakistan referred to marine organisms found in the Sonmiani Bay area (Moinuddin and Qureshi, 1962; Zupanovic and Moinuddin, 1973 and Van Zalinge *et al.*, 1987), but their studies were mainly concerned with the area outside the lagoon. However, Amjad (1984) first collected *Penaeus merguensis* which is now *Fenneropenaeus merguensis* from the lagoon. Ahmed and Ayub (1996) mentioned its most abundance by using gill net and beam net. Ahmed (1991) listed the flora and fauna of Miani Hor at Damb for the first time. The second abundant species was *Penaeus (Fenneropenaeus) penicillatus*, and then the third and fourth abundant species were *Parapenaeopsis stylifera* and *Metapenaeus stebbingi* respectively. The male/female ratio of *Fenneropenaeus* was 52 and 47%. The present pattern of *Fenneropenaeus merguensis* abundance in the Sonmiani Bay is consistent with the earlier findings of Zupanovic (1971 and Ahmed and Ayub (1996) Ahmed (1985) discussed the change of distribution pattern of *Parapenaeopsis stylifera* in fairly large number at the Miani Hor.

Zupanovic (1971) mentioned that *Fenneropenaeus penicillatus* is completely absent on absence of *Metapenaeus monoceros*, *Penaeus semisulcatus* and *P. monodon* from the samples in the lagoon can be attributed to sampling in shallow depths. The given species were reported as dominant in the area (Zupanovic and Mohiuddin, 1973). *Fenneropenaeus indicus*, *Metapenaeus affinis*, *Parapenaeopsis hardwickii* the Mekran coast west of Sonmiani Bay, Ahmed and Ayub (1996) *Fenneropenaeus penicillatus* only 2.34% reported. In the earlier study are absent, the absence can be attributed to the different gear used) – mentioned portion is confusing, please make clear the portion.

Among the four species of penaeids, namely *Fenneropenaeus merguensis*, *Fenneropenaeus penicillatus*, *Metapenaeus affinis*, and *Parapenaeopsis sculptilis* are present in the catches in order of abundance. In the *Metapenaeus* population, some specimens resist their specific identification. Further study is required to determine the species. Among the by-catches, 41 species of fin fishes were collected by Thukri net during survey period, shown in Table-3. Among them, Anchovies (Paddane) of the family Engraulidae were first in abundance (19.5%), then the croakers (Mushka) of the

family Scianidae occupied the second position (14.5%), followed by *Liza* group (Mori) of the family Mugillidae occupied third position (11.8%).

Catch per unit effort of thukri net in 2008-2009 and 2009-2010:

The fisherman operated Thukri net for about 20-days in a month, during the nine active months in fishing season (August to April). In a fishing season the number of fishing days in a month depends on the catch rate and favorable environmental conditions.



Fig. 3. Catch of Jaira shrimp by Thukri net.

A- Shrimp:

The maximum catch of shrimp was recorded 7.50kg/net/day in the month of September 2008 and the minimum of 0.50kg/net/day in the month of April 2009. The average catch of shrimp was 4.33kg/net/day, 86.61kg/net/month and 779.40kg/net/year during 2008-2009. In 2009-10, the maximum catch of shrimp was recorded 7.00kg/net/day in the month of September 2009 to a minimum of 2.50kg/net/day in the month of April 2010. The average monthly catch was 92.2kg/net and annual catch was 829.8kg/net (Tables 1, 2 & 5) (Figs. 3, 5).

The catch rate of shrimp for the fishing season 2009-2010, varied from a minimum of 2.50kg/net/day in the month of April 2010 which was maximum up to 7.00kg/net/day in the month of August, 2009. In this period, the average daily catch of shrimp was 4.66kg/net, average monthly catch was 93.2kg/net and average annual catch was 838.8kg/net (Tables 1, 2 & 5) (Fig. 8).

Table 1. Catch of shrimp and fishes by thukri net (2008-2009).

Date	Total Catch of Shrimp (Kg/Day/Net)	Rate (Rs/Kg)	Total Catch of Fishes (Kg/Day/Net)	Rate (Rs/Kg)
August 08	6.00	450	35	5.00
Sept. 08	7.50	450	37	6.00
Oct. 08	3.50	450	26	6.00
Nov. 08	4.00	400	28	6.00
Dec. 08	5.00	400	15	6.00
Jan. 09	6.00	350	23	7.00
Feb. 09	3.50	350	19	7.00
Mar. 09	3.00	360	13	6.00
Apr. 09	0.50	300	12	6.00
Average:	4.33	390	23.11	6.11

Table 2. Catch of shrimp and fishes by thukri net (2009-2010).

Date	Total Catch of Shrimp (Kg/Day/Net)	Rate (Rs/Kg)	Total Catch of Fishes (Kg/Day/Net)	Rate (Rs/Kg)
August 09	7.00	500	38	5.00
Sept. 09	6.00	500	40	5.00
Oct. 09	5.00	450	32	6.00
Nov. 09	4.00	450	27	6.00
Dec. 09	4.00	450	22	7.00
Jan. 10	5.00	400	24	7.00
Feb. 10	4.00	400	20	7.00
Mar. 10	4.00	400	20	7.00
Apr. 10	2.50	300	16	6.00
Average:	4.61	427.77	26.55	6.20





Table 3. Catch of fish species with local/English names, collected by thukri-net from August 2008 to April 2010 at Sonmiani.

S. No.	Local Name	English Name	Family	Genus/Species
1	Achopito/ Safed Poplet	Silver Pomfret	Stromateidae	<i>Pomus argenteus</i>
2	Bhambor	Lady Fish	Sillaginidae	<i>Sillago sihama</i>
3	Bombil	Bombay-Duck	Harpodoniidae	<i>Harpodon nehereus</i>
4	Bothan-I	Electric Ray	Torpedinidae	<i>Torpedo sinuspersici</i>
5	Bothan-II	Numb-fish	Narcinidae	<i>Narcine deapterygia</i>
6	Chuki-I	Tuna/Mackerel	Scombridae	<i>Auxis thezard</i>
7	Chuki-II	Indian Mackerel	Scombridae	<i>Rastrelligor kanagurta</i>
8	Dhambo	Thorny check grouper	Carangidae	<i>Epinephelus diacanthus</i>
9	Dhothar-I	Silver Grunt	Pomadasyidae	<i>Pomadasy argenteus</i>
10	Dhothar-II	Lined Silver Grunt	Pomadasyidae	<i>P. hasta</i>
11	Ginghara	Crescent perch	Theraponidae	<i>Terapon jarbua</i>
12	Hajjam	Indian Talibut	Psettodidae	<i>Psettodes erumil</i>
13	Jirkani	Tooth Pony	Leiognathidae	<i>Gazza minute</i>
14	Kagga	Sea Cat-Fish	Ariidae	<i>Arius maculates</i>
15	Kango	Gar-Fish/Needle Fish	Belonidae	<i>Strongylura strongylura</i>
16	Kanteri	Pony Fish	Leiognathidae	<i>Secutor insidiator</i>
17	Karo-Pitho	Black Pomfret	Carangidae	<i>Formio niger</i>
18	Kissi/Dhandia-I	Yellow Fin	Sparidae	<i>Acanthopagrus latus</i>
19	Kissi/Dhandia-II	Gold Line Bream	Sparidae	<i>Rhabdosargus sarba</i>
20	Korgi/Dateera	Spotted Scad	Scatophagidae	<i>Scatophagus argus</i>
21	Kukker	Flat-Head Fish	Platycephalidae	<i>Cociella crocodile</i>
22	Luor/Lugger	Oil Sardine	Clupeidae	<i>Sardinella longiceps</i>
23	Mangra-I	Broad Fin Shark	Carcharhidae	<i>Lamiopsis temmineck</i>
24	Mangra-II	Spade Nose Shark	Carcharhidae	<i>Scoliodon laticaudus</i>
25	Mori/Murbo-I	Grey Mullet	Mugilidae	<i>Liza vaigiensis</i>
26	Mori/Murbo-II	Green Back Grey Mullet	Mugilidae	<i>L. subviridis</i>
27	Mushka-I	Croaker	Sciaenidae	<i>Johnius carutta</i>
28	Mushka-II	Tigertooth Croaker	Sciaenidae	<i>Otolithes rubber</i>
29	Mushka-III	Lesser Tigertooth Croaker	Sciaenidae	<i>O. cuvieri</i>
30	Paddane-I	Malabar Anchovy	Engraulidae	<i>Thrissoles malabarica</i>
31	Paddane-II	Thryssa Anchovy	Engraulidae	<i>T. hamiltoni</i>
32	Paddane-III	Gold Spotted Anchovy	Engraulidae	<i>Coilia dussumiei</i>
33	Palli-I	Shad	Clupeidae	<i>Anodontostome chacunda</i>
34	Palli-II	Toli Shad	Clupeidae	<i>Tenuulosa toil</i>
35	Palli-III	Toothed Shad	Clupeidae	<i>Pellona ditchela</i>
36	Pittan-I	Sting Ray	Dasyatidae	<i>Himantura uarnak</i>
37	Pittan-II	Sting Ray	Dasyatidae	<i>Himantura gerradi</i>
38	Seem-I	Russel Scad	Carangidae	<i>Decapterus russeli</i>
39	Seem-II	Yellow Strips Scad	Carangidae	<i>D. macrosoma</i>
40	Seem-III	Banded Scad	Carangidae	<i>Caranx para</i>
41	Sole/Swasoo-I	Elongate Sole	Soleidae	<i>Solea elongate</i>
42	Sole/Swasoo-II	Fringefin Sebra Sole	Soleidae	<i>Zebrias quagga</i>
43	Sole/Swasoo-III	Brown Tongue Sole	Cynoglossidae	<i>Cynoglossus arel</i>
44	Talwar/Chind	Hair Tail Fish	Trichiuridae	<i>Trichiurus lepturus</i>
45	Toto	Puffer-Fish	Tetraodontidae	<i>Tetrosomus gibbosus</i>

Table 4. Catch and rank (20 most abundant) of major finfishes collected with thukri net in Sonmiani, (from 15th August 2008 to April 15th 2009 and from 15th August 2009 – 15th April 2010).

S. No.	Species	Local Name	English Name	Rank	Season
1.	<i>Thryssa</i> spp.	Paddane	Enchovy	First	Winter
2.	<i>Johnius</i> spp.	Mushka	Croaker	Second	Summer
3.	<i>Liza</i> spp.	Mori	Mullet	Third	Winter
4.	<i>Arius</i> spp.	Kagga	Sea catfish	Fourth	Winter
5.	<i>Sole</i> spp.	Sole	Sole	Fifth	Summer
6.	<i>Hilsa</i> spp.	Palli	Shad/Hearing	Sixth	Summer
7.	<i>Scoliodon</i> spp.	Mangra	Shark	Seventh	Summer
8.	<i>Trichiorus</i> spp.	Talwar	Hair-Tail fish	Eight	Summer
9.	<i>Sillago</i> spp.	Bambor	Lady fish	Ninth	Winter
10.	<i>Cociella</i> spp.	Kukker	Crocodile flat head fish	Tenth	Winter
11.	<i>Pomadasy</i> spp.	Dhother	Grunt	Eleventh	Summer
12.	<i>Hamantura</i> spp.	Pittane	Sting-Ray fish	Twelfth	Summe
13.	<i>Decapterus</i> spp.	Bungro	Scad	Thirteenth	Winter
14.	<i>Thylosurus</i> spp.	Kango	Hound needle fish	Fourteenth	Summer
15.	<i>Acanathopagrus</i> spp.	Kanteri	Bream	Fifteenth	Summer
16.	<i>Psettodes</i> spp.	Hajjam	Turbot	Sixteenth	Summer
17.	<i>Gaza</i> spp.	Jirkani	Pony fish	Seventeenth	Summer
18.	<i>Pompus</i> spp.	Acho Pitho	Silver pomfret	Eighteenth	Summer
19.	<i>Formio</i> spp.	Karo Pitho	Brown pomfret	Nineteenth	Winter
20.	<i>Secutor</i> spp.	Kanteri	Pony fish	Twentieth	Summer

Table 5. Catch of shrimp species with Local/English Names, collected by thukri-net from August 2008 to April 2010 at Sonmiani.

Species	Local Name	English Name	Average Size (cm)
 <i>Fenneropenaus merguensis</i>	Jaira	Banana shrimp	15-18
 <i>F. penicillatus</i>	Jaira	Red tail shrimp	12-16
 <i>Metapenaeus affinis</i>	Kalari	Jhinga shrimp	10-14
 <i>Parapenaeopsis sculptilis</i>	Kidi	Kidi shrimp	9-12

B- Fishes:

The catch rate of fishes (by-catches) was maximum of 3700 kg/net/day in September, 2008 and minimum of 12kg/net/day in the month of April, 2009. The average monthly catch rate was 462.2kg and average annual catch was 4159.8kg in the year 2008-2009. And for the year 2009-10, the maximum catch rate of fishes (by-catches) was 40kg/net/day recorded in September 2009 and a minimum of 16kg/net/day in April 2010. The average monthly catch rate was 531kg/net and annual catch was 4779kg/net (Table 1) (Figs. 4, 6). Comparison of total catch of shrimps and fishes (per day per net) during 2008 to April 2009 were presented in Fig. 7.



Fig. 4. By catches by Thukri net.

The catch rate of fishes (by-catch) during the fishing period 2009-2010 was maximum of 40 kg/net/day in September 2009 and minimum of 10 kg/net/day in April 2010. The average monthly catch rate was 531kg/net and average annual catch rate was 4779 kg/per/net in the fishing period 2009-2010. The details of the catches for the two fishing seasons (2008-09 and 2009-10) have shown in Table 2 and the catch of fishes with local names are presented in Tables 3 & 4 and in Fig. 9. The comparison of total catch of shrimps and fishes (per day per net) during 2008 - 2009 has shown in Fig. 10.

The production of the Thukri net of the shrimp was estimated 779.40 kg/boat/year and 830 kg/boat/year in 2008-2009 and 2009-2010 respectively. In case of fish, the production was estimated 4160 kg/boat/year and 4779 kg/boat/year in 2008-2009 and 2009-2010 respectively.

The results of catch composition of shell fish and fin fish are somewhat similar to that of the earlier studies reported by Ahmed and Ayub (1996) and Ahmed (1999).

The samples of shrimps and finfish were collected fortnightly from the Sonmiani. The shrimps were identified as *Fenneropenaeus merguensis*, *F. penicillatus*, *Metapenaeus affinis*, *M. stebbingi* and *Parapenaeopsis sculptilis*. The most abundant species in the catch was *Fenneropenaeus merguensis* which comprised about 80% of the total catch and *F. penicillatus* was recorded as is the second most abundant penaeid found in the Miani Hor (Sonmiani). The survey also showed that a large number of finfish are present in the Miani lagoon, many of which are economically important. The important commercial species collected from the area were belonged to the genera of *Thryssa*, *Johnius*, *Pomadasy*, *Solea*, *Sillago* and *Liza*. It was also noted that as by-catches, the fishes were significantly higher in abundance compared to other animal-groups collected

from Sonmiani. The salinity and other climatic conditions were found to be favorable for fish of the lagoon.

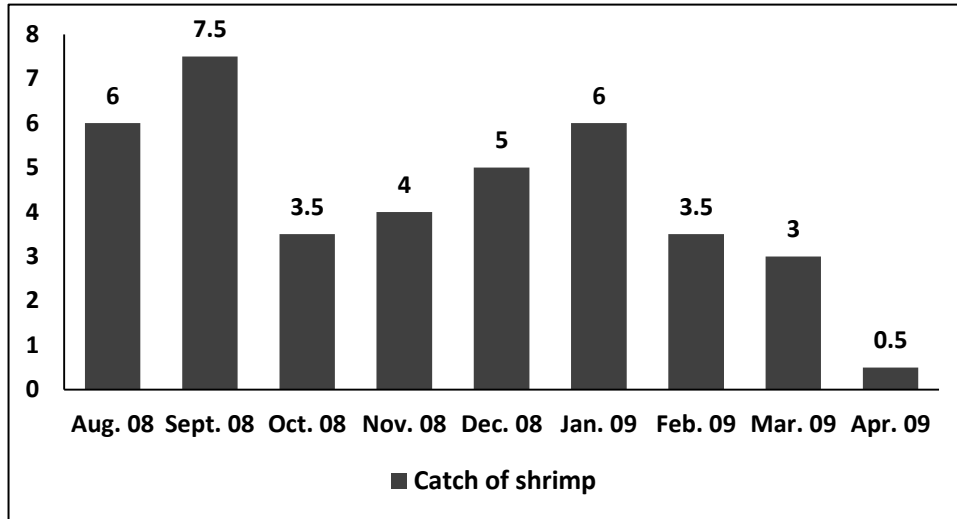


Fig. 5. Total catch of shrimps per day per net for August 2008 to April 2009.

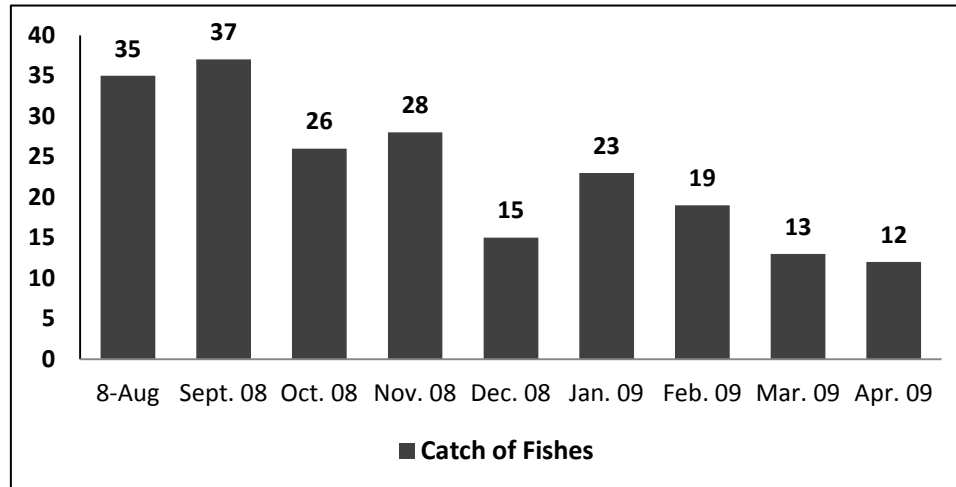


Fig. 6. Total Catch of fishes per day per net for August 2008 to April 2009.

The catch of present study shows that the genus *Thryssa* was first in numerical abundance (19.5%) of the total caught. The results coincide with the investigations of Zupanovic and Moinuddin (1973) and Anonymous (1978) on *Thryssa* spp. which is was also reported to be frequently caught along the entire coast of Pakistan. But sampling

conducted by beam trawl and beach seine in April to March at the depth of 4-5ft for juveniles, Ahmed and Abbas (1999) mentioned a different composition where *Coilia dussumieria* was being the first and *Liza subviridis* was fourth in abundance.

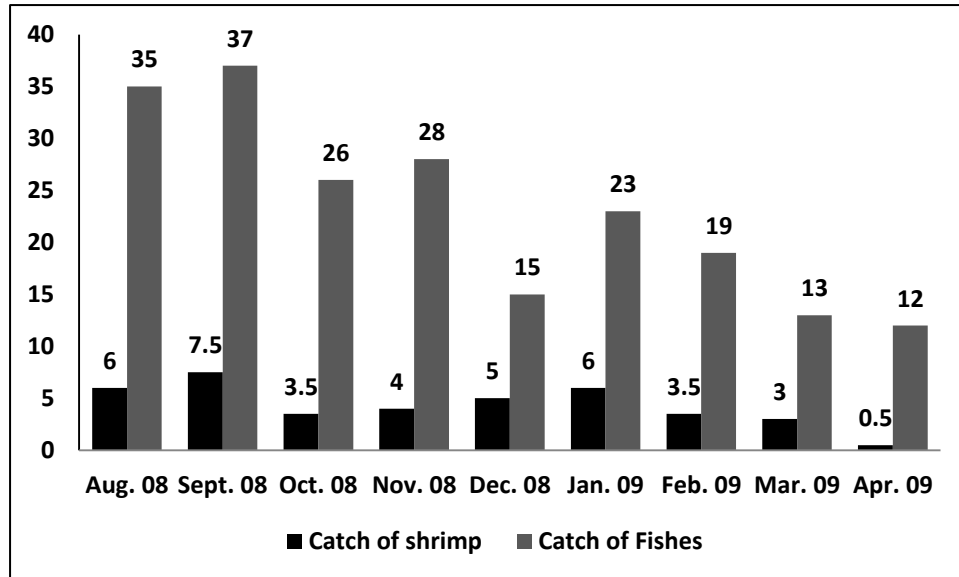


Fig. 7. Comparison of Total catch of shrimps and total catch of fishes (per day per net) for August 2008 to April 2009.

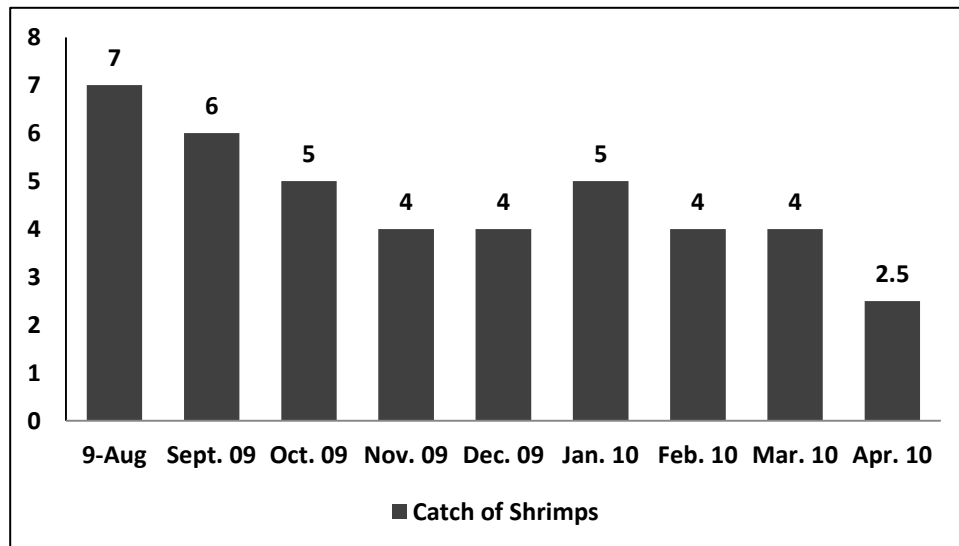


Fig. 8. Total catch of shrimps per day per net for August 2009 to April 2010.

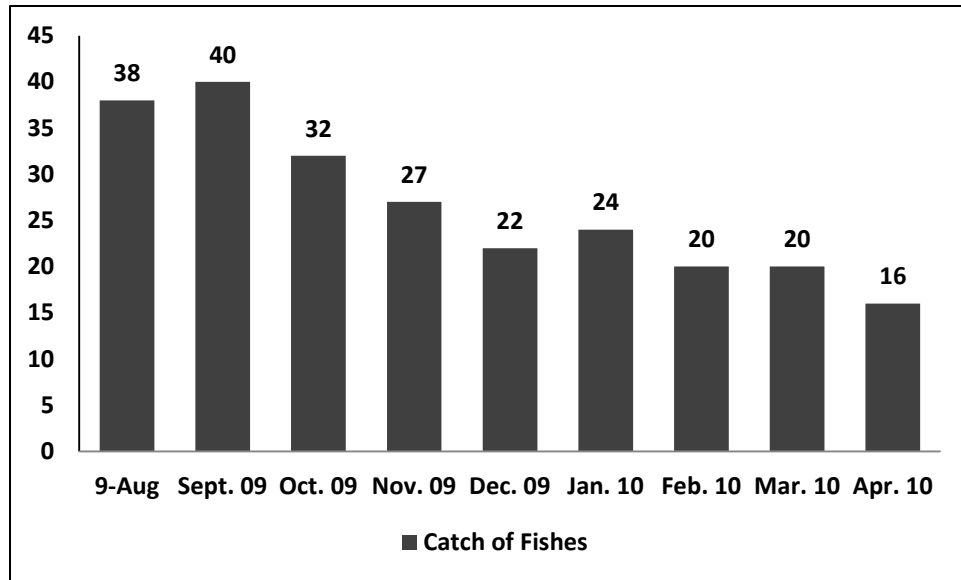


Fig. 9. Total catch of fishes per day per net for August 2009 to April 2010.

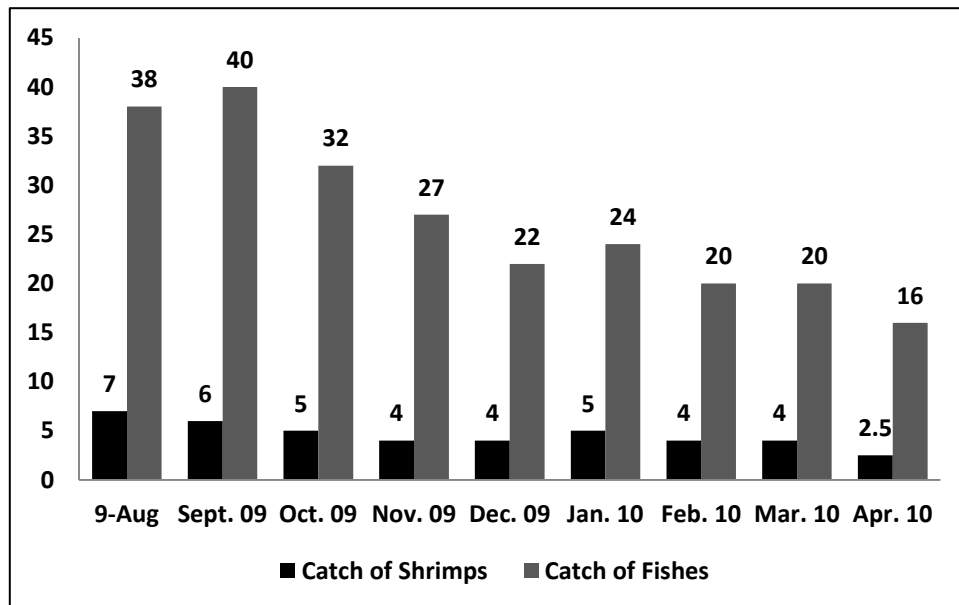


Fig. 10. Comparison of total catch of shrimps and total catch of fishes (per day per net) for August 2009 to April 2010.

CONCLUSION

Most shrimp and finfish caught in the area were exhibited more or less same size ranges and same predominant age groups. They were mostly sub-adults and mature individuals. The penaeid shrimp caught by this net were, fairly large in size and contained much less juveniles and immature individuals, in comparison to other gears.

The Thukri net operated in Sonmiani is the most efficient and economical gear for the bays and inshore fisheries. As the most catches are sub-adult and adults of selected species of shrimp and finfish, hence this type of artisanal gear would not be destructive to the shrimp and finfish stocks. So the Thukri net may be a selective gears and friendly to the environment.

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