

## Catch Analysis of Gillnetters Operating Off Veraval Coast, Gujarat, India

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### ABSTRACT

The present study was carried out from February 2012 – April 2013 to assess the overall fish catch composition of gillnetters operating from Veraval fishing harbour (Gujarat). The major fish caught by Out Board Motor (OBM) gillnetters was Indian mackerel (21.76%) followed by Horse mackerel (18.04%) and Silver bar (16.37%). The productive month for OBM gillnetters was September, which contributed 16.34%. Pelagic fish group had maximum representation with 89.12% and demersal group contributed 10.90%. Among seasons, post monsoon season was more productive with a maximum contribution of 39%.

**Key words:** Veraval fishing harbour, Fish Catch, Gillnetting, OBM.

### INTRODUCTION

Gillnet is a highly selective fishing gear and is one of the most suitable fish catching method from conservation and stock regulation point of view<sup>11</sup>. Gujarat is a leading maritime state of India located in the extreme west of the country (20.1° to 24.7° North and 68.4° to 74.4° East). Gujarat with about 20% of the country's coastline (1600 kms.), 33% of the continental shelf area (1, 64,000 km<sup>2</sup>) and over 2, 00,000 km<sup>2</sup> of EEZ (Exclusive economic zone) ranks second among the maritime states in marine capture fish production.

Out Board gillnetters play an important role as it contribute about 15.83% overall fish production in Gujarat. There has

been continuous increase in the number of mechanized boats in the fishing fleet of state since last decade<sup>5</sup>. Presently, more than 32,486 boats are active in fishing operation, out of which more than 20,359 are mechanized boats and 7,184 are gillnetters operating in coastal waters of Gujarat<sup>1</sup>.

Junagadh is the major district of the Saurashtra region, with coastline about 156 km. About 9,496 boats are operating from Junagadh district, out of which 4,608 are OBM gillnetters<sup>1</sup>. Total marine landing of Junagadh district during 2015-2016 was 2, 59762 metric tones<sup>1</sup>. Veraval fishing harbour is located between Lat- 20°54' N and Lon- 79°22'E, which is 2 km far from the main Veraval city.

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Veraval is a major fishing harbour of the Junagadh district and it is the main fishing harbour of Saurashtra region. Total number of OBM gillnetters operating from this harbour is 932. Catch composition a total of 30 OBM gillnetters was weekly sampled randomly during the study to collect the envisaged information<sup>5</sup>.

### MATERIAL AND METHODS

The present work was undertaken to study the catch composition of the gillnetters operating gillnet along the of Veraval fishing harbour. The study was carried out for a period of one year from February 2012 to April 2013. Total 30 OBM gillnetters were randomly sampled. The periodical random sampling method was adopted for sampling of gillnetters as per. The samples were analyzed and identified up to the species level. The species composition was arrived at for each sample. The data obtained for all the weeks in the month was pooled and presented as monthly samples. The data was also analysed season wise viz. June to September (Monsoon season), October to January (Winter season) and February to May (Summer season) to know the dominant catch over different months and season. The results are expressed as mean  $\pm$  std. error for all the collected data.

### RESULTS AND DISCUSSION

Month wise landings from February, 2012 to April, 2013 are given in Table 4.10. Altogether 15 different fish, varieties were landed by gillnetters along the Veraval fishing harbour. Month wise landing and landing percentage contribution is shown in Fig 4.5. In the present studies of pure twelve months catch data, it was found that during the month of February, 2012 it shares (10.78%) of total catch, but in the month of March, 2012 the catch was found less (6.30%), but again the catch drastically decreased to (5.57%) in April, 2012. In the month of May, 2012 the catch was found higher compared to previous month (14.46%). The landing was maximum in September, 2012 (16.34%) which was followed by October, 2012 (15.52%) then it decreased to

(6.76%) in November, 2012 and further it drastically decreased to (5.38%) in December, 2012, and again the catch decreased to (4.91%) in January, 2013, while in February, 2013 the catch increased to (5.77%), but during the month of March, 2013 the catch slightly decreased to (5.3%), but in overall studies the catch was found lowest during the month of April, 2013 (2.87%). Indian Mackerel, Horse Mackerel, Ribbonfish, Indian shad, Sardine, Silver bar, Cat fishes and Croakers were available throughout the year. Species like Seer fishes, Tuna and were also available for six or eight months. Silver Pomfret, Black Pomfret was seen only in the months of September and November.

The month of September, October and November are considered as a postmonsoon season. Post-monsoon season contributed 39.10% of the total catch. Indian Mackerel and Full beaks dominated the catches in post-monsoon months. Of the total catch, 26.84% landing observed in the winter season dominated by Indian Mackerel, Horse Mackerel and Silver bar. Horse Mackerel and Indian Mackerel formed the dominant group during March to May which was considered as pre-monsoon season and the percentage landing during this period was 34.10%. Thus, the data of species wise landings were pooled together according to season to observe the effect of season on catch statistics. The species wise landings according to season are presented in Table 4.11 and Fig. 4.8. The post monsoon season was more productive and percentage contribution was (39.10%), which was followed by Pre monsoon (34.10%) and winter (26.84%). The Indian Mackerel was dominating during post monsoon and winter seasons, while as Horse Mackerel dominated the group during the Pre monsoon season. The comparison between different seasons showed that the share of the Indian Mackerel was seasonal and had higher percentage values in winter season (64.96%) and lower in Post monsoon (60.98%).

Along the north-west region of India, Sehara and Karbhari<sup>8</sup> studied the catch composition of mechanised gillnetters

operated along the Khar-Danda and Satpati in Thane district of Maharashtra. They reported that the fish varieties caught in gillnets were seerfish, catfish, shark, hilsa, croakers and silver bar with highest contribution of seerfish in the total landing. Whereas Koya and Vivekanandan<sup>4</sup> reported the in the catches landed by gillnets, the variety of catch consisted of elasmobranches, clupeid, seerfish, pomfret, tuna, carangids, catfish, ribbonfish and sciaenid along Veravel coast of Gujarat with maximum contribution of elasmobranches. Similar studies were carried out along the south-west coast of India Silas *et al*<sup>10</sup>, Sathiadhas and Panikkar<sup>6</sup>, Iyer<sup>3</sup>. Datta and Dan<sup>2</sup> reported hilsa, pomfret and catfish as major varieties landed by OBM gillnetters along the West Bengal coast. Similarly elasmobranches, sardines, perches, mackerel, croakers, carangids, seerfish, catfish, goat fish, ribbonfish and hilsa were the important species landed along the Tamil Nadu coast in south-east region of India whereas other sardines contributed maximum to the total catch<sup>7</sup>. Indian mackerel was the major fish caught by OBM gillnetter along the Ratnagiri coast of Maharashtra<sup>5</sup>.

The catch composition of the present study was similar to the above reports from India. Moreover few species reported by Sehara and Karbhari<sup>8</sup> along the coast of Maharashtra and by Koya and Vivekanandan<sup>4</sup> along the Veraval coast were in accordance with the catch composition of the present study. The similarity in the catch composition of the present study and that of Koya and Vivekanandan<sup>4</sup> indicateds that the species composition of the gillnet has not changes over a period of almost two decades in this region.

Sehara and Karbhari<sup>8</sup> reported seerfish as a major contributor species at Khar-Danda in Maharashtra with mechanised gillnetters. During present study the average depth of operation was 20-50 m, whereas Sehara and Karbhari<sup>9</sup> reported that the gillnetters operated up to the depth of 30 fathoms i.e. 180 mts. Thus, it can be concluded that the depth of

operation plays an important role in species composition of gillnet catches.

In the present study, month wise analysis showed that maximum productive month for OBM gillnetters was September, 2012 (16.34%) followed by October, 2012 (15.52%) and May, 2012 (14.46%). Silas *et al*<sup>10</sup>, reported July with 19.43% followed by August (18.7%) and May (12.07%) as the most productive month. Markad<sup>5</sup>, reported that October was the most productive month with (26.95%), followed by December with (17.98%) and April with catch 8.42% on Ratnagiri coast, Mahrashtrara. In the present study, data during July month was not collected due to monsoon fish ban period and thus landings of this month were not recorded.

Similar findings were also reported by Sehara and Karbhari<sup>8</sup> at selected centres along the Maharashtra coast. They reported that the post-monsoon quarter (September-November) were most productive with the seerfish as maximum contributor to gillnet fishing. Silas *et al*<sup>10</sup>, reported April and July to October months as more productive in the year 1981 and the productive months during the year 1982 were April, May and July-October. Sathiadhas and Panikkar<sup>6</sup> reported monsoon as the most productive season along the Trivandrum coast, whereas, Koya and Vivekanandan<sup>4</sup> reported maximum landings in the September. Markad<sup>5</sup>, reported peak landings along Ratnagiri coast in the October month.

The results of present study were similar to the results carried out along the Maharashtra coast by Sehara and Karbhari<sup>8</sup>. However Sathiadhas and Panikkar<sup>6</sup> reported monsoon season as the most productive along Trivendrum coast. This may be because, in the present study, June, July and August were considered as monsoon season and there was a complete ban on fishing during monsoon season as per Gujarat Marine Fishing Regulation Act, 2003. Sehara and Karbhari<sup>9</sup> reported that July to November were the productive months or else monsoon and post-monsoon as most productive seasons.

Table 1: Details of species wise mean fish landings (kg) of OBM gillnetters from February 2012 to April 2013

Sr.No.	SPECIES	Feb,	Mar,	Apr,	May,	June -	Sept,	Oct,	Nov,	Dec,	Jan,	Feb,	Mar,	Apr,	Total
		2012	2012	2012	2012	August	2012	2012	2012	2012	2012	2013	2013	2013	
<b>Pelagic fishes</b>															
1	Spotted seerfish <i>Scomberomorus guttatus</i>	3.28 (±0.37)	1.50 (±0.19)	2.40 (±0.23)	2.13 (±0.25)	Monsoon Fishing Ban	0.96 (±0.19)	2.70 (±0.48)	1.98 (±0.28)	0	0	0	2.16 (±0.30)	0	17.11
2	Streaked seerfish <i>Scomberomorus commerson</i>	4.05 (±0.55)	2.00 (±0.26)	1.17 (±0.18)	2.31 (±0.60)		1	2.08 (±0.26)	1.93 (±0.37)	0	0	0	1.09 (±0.18)	0	15.63
3	Indian mackerel <i>Rastrelliger Kanagurta</i>	18.78 (±2.05)	17.18 (±1.18)	11.00 (±1.23)	7.43 (±0.98)		14.85 (±1.11)	22.18 (±1.87)	14.36 (±1.14)	13.89 (±0.92)	14.08 (±1.49)	18.21 (±1.81)	14.55 (±1.06)	10.87 (±1.43)	177.38
4	Horse mackerel <i>Megalaspis cordyla</i>	10.61 (±1.54)	10.43 (±0.78)	8.22 (±0.84)	10.68 (±1.61)		28.24 (±2.91)	30.84 (±3.01)	18.3 (±2.41)	9.25 (±1.27)	3.88 (±0.78)	10.52 (±2.15)	2.35 (±0.39)	3.8 (±0.83)	147.12
5	Ribbonfish <i>Trichiurus lepturus</i>	6.00 (±0.63)	3.30 (±0.43)	2.85 (±0.66)	4.86 (±0.97)		15.36 (±2.49)	20.94 (±2.66)	7.12 (±0.83)	3.32 (±0.37)	3.92 (±0.38)	4.07 (±0.61)	3.71 (±0.49)	2.12 (±0.66)	77.57
6	Little tuna <i>Euthynnus affinis</i>	1.45 (±0.22)	0	0	0		0	0	0.33 (±0.13)	3.9 (±0.40)	2.76 (±0.32)	1.1 (±0.24)	0	0	9.54
7	Long tail tuna <i>Thnnus toggol</i>	1.75 (±0.28)	0	0	0		0	0	0	2.59 (±0.28)	2.19 (±0.31)	0.73 (±0.19)	0	0	7.26
8	Indian shad <i>Tenulosa ilisha</i>	3.09 (±0.42)	2.90 (±0.54)	2.32 (±0.53)	7.63 (±1.33)		6.11 (±1.35)	3.54 (±0.55)	2.30 (±0.37)	1.33 (±0.19)	1.24 (±0.26)	1.71 (±0.43)	2.35 (±0.33)	0.52 (±0.19)	35.04
9	Sardine <i>Dussumieria acuta</i>	3.26 (±0.38)	2.77 (±0.36)	3.00 (±0.55)	10.09 (±1.67)		5.39 (±0.99)	3.48 (±0.69)	1.25 (±0.22)	2.47 (±0.30)	2.75 (±0.43)	2.53 (±0.49)	3.85 (±0.55)	1.07 (±0.27)	41.91
10	Silver bar <i>Chirocentrus dorab</i>	22.33 (±2.94)	4.09 (±0.94)	1.22 (±0.23)	22.22 (±2.53)		45.39 (±3.69)	24.00 (±3.32)	2.66 (±0.39)	2.43 (±0.26)	2.56 (±0.33)	2.12 (±0.41)	3.01 (±0.36)	1.43 (±0.25)	133.46
11	Full beak <i>Tylosurus sp.</i>	6.88 (±1.45)	2.88 (±0.53)	9.97 (±1.38)	43.13 (±1.76)		0.55 (±0.13)	1.14 (±0.22)	0	0	0	0	0	0	64.55
<b>Demersal fishes</b>															
12	Silver pomfret <i>Pampus argenteus</i>	0	0	0		5.83 (±0.39)	3.64 (±0.33)	0.53 (±0.14)	0	0	0.52 (±0.17)	3.21 0.33	0	13.73	

13	Black pomfret <i>Formio niger</i>	0	0	0		5.93 (±0.66)	4.52 (±0.64)	0.39 (±0.15)	0	0	1.3 (±0.33)	1.69 0.25	0	13.83
14	Cat fish <i>Arius thalassinus</i>	3.07 (±0.30)	2.03 (±0.33)	1.13 (±0.20)	5.17 (±0.98)	1.42 (±0.23)	4.23 (±0.81)	2.58 (±0.46)	2.25 (±0.26)	2.41 (±0.28)	2.12 (±0.42)	4.03 (±0.52)	1.78 (±0.26)	32.22
15	Croaker <i>Johnius sp.</i>	3.35 (±0.26)	2.32 (±0.33)	2.15 (±0.39)	2.28 (±0.41)	2.23 (±0.28)	3.26 (±0.52)	1.51 (±0.31)	2.43 (±0.39)	4.28 (±0.47)	2.11 (±0.42)	1.21 (±0.25)	1.83 (±0.38)	28.96
	<b>Total</b>	<b>87.9</b>	<b>51.4</b>	<b>45.43</b>	<b>117.93</b>	<b>133.26</b>	<b>126.55</b>	<b>55.24</b>	<b>43.86</b>	<b>40.07</b>	<b>47.04</b>	<b>43.21</b>	<b>23.42</b>	<b>815.31</b>
	<b>Percentage contribution (%)</b>	<b>10.78</b>	<b>6.3</b>	<b>5.57</b>	<b>14.46</b>	<b>16.34</b>	<b>15.52</b>	<b>6.76</b>	<b>5.38</b>	<b>4.91</b>	<b>5.77</b>	<b>5.3</b>	<b>2.87</b>	<b>100.00</b>

Values in parenthesis are S.E of mean

(S.E. in some cases could not be estimated due to less number of landing values)

**Table 2: Details of species wise landings (kg) of OBM Gillnetters according to season**

Sr.No	Species	Post monsoon			Winter			Pre monsoon			Total
		Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	
1	Spotted seerfish <i>Scomberomorus guttatus</i>		8.19 (±0.83)			3.28 (±0.3)			5.64 (±0.61)		17.11
2	Barrred seerfish <i>Scomberomorus commerson</i>		6.57 (±0.67)			4.05 (±0.37)			5.01 (±0.64)		15.63
3	Indian mackerel <i>Rastrelliger Kanagurta</i>		60.98 (±5.64)			64.96 (±5.930)			51.39 (±4.38)		177.33
4	Horse mackerel <i>Megalaspis cordyla</i>		35.48 (±3.82)			34.26 (±5.17)			70.38 (±7.55)		140
5	Ribbonfish <i>Trichiurus lepturus</i>		16.84 (±2.55)			17.31 (±1.91)			43.42 (±4.00)		77.57
6	Little tuna <i>Euthynnus affinis</i>		0			9.21 (±1.09)			0.33 (±0.13)		9.54
7	Long tail tuna <i>Thnnus toggol</i>		0			7.26 (±0.94)			0		7.26
8	Indian shad <i>Tenualosa ilisha</i>		15.72 (±1.68)			7.37 (±1.16)			11.95 (±2.04)		35.04
9	Sardine <i>Dussumieria acuta</i>		20.78 (±2.23)			11.01 (±1.52)			10.12 (±1.53)		41.91

Sr. No	Species	Post monsoon			Winter			Pre monsoon			Total
		Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	
10	Silver bar <i>Chirocentrus dorab</i>		31.97 (±3.11)			29.44 (±3.04)			42.05 (±6.28)		103.19
11	Full beak <i>Tylosurus sp.</i>		55.98 (±4.38)			6.88 (±0.63)			1.69 (±0.23)		64.55
12	Silver pomfret <i>Pampus argenteus</i>		3.21 (±0.33)			0.52 (±0.17)			10 (±0.86)		13.73
13	Black pomfret <i>Formio niger</i>		1.69 (±0.25)			1.3 (±0.33)			10.84 (±1.22)		13.83
14	Cat fish <i>Arius thalassinus</i>		51.58 (±4.95)			9.85 (±1.24)			8.23 (±1.08)		69.66
15	Croaker <i>Johnius sp.</i>		9.79 (±1.44)			12.17 (±1.59)			7 (±0.89)		28.96
	<b>Total</b>		<b>318.78</b>			<b>218.87</b>			<b>278.05</b>		<b>815.31</b>
	<b>Percentage contribution (%)</b>		<b>39.10</b>			<b>26.84</b>			<b>34.10</b>		<b>100.00</b>

Values in parenthesis are ± S.E of mean

(S.E. in some cases could not be estimated due to less number of landing values)

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