

## Comparative studies on biomass index of selected fish species of Arnala and Satpati coasts of Palghar district in Maharashtra

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### Abstract

Aquatic animals like fishes cannot be merely counted numerically due to their larger populations. Hence their population density can be only measured by using the technique of biomass index. Observations done in relation to the biomass index of commercially important edible fishes in the marine habitats of the same as well as different shores over a long period of time can give a firm idea about the status of the habitat in different seasons, overall yield of the fishes over a certain season and fluctuations in the same as well as overexploitation of the natural resource or over harvesting of the fishes in the study area. It could also give birth to the strategy for conservation of edible species, need of absolute prohibition of fishing during the breeding season of concerned fishes as well as controlled fishing during the season so as to offer a chance to the seedlings and young ones to grow. With the same view, studies on biomass index of two commercially important edible Indian marine fish species as Pomfret [*Pampusargenteus*] and Bombay duck [*Harpadonnehereus*] were carried out during a study period of September 2013 to October 2014. The studies were carried out in concern to the Arnala and Satpati coasts of Palghar District. Studies were carried out involving visit to the coasts at regular time intervals, weighing of the catch of different trawlers and small boats which are of ultimate concern to the local fishermen by all means. The conclusions were drawn by proper arrangement and analysis of the data from both the coasts using appropriate statistical tools.

### INTRODUCTION

Maharashtra is an important maritime state with the reference to marine fish production. The estimated annual marine fish production varies from 3 to 4 lac tons. More than six thousand mechanized boats are in operation. There has been continuous increase in mechanized boats in the state since last one decades (Sehara and Karbhari, 1987). In Maharashtra; there is significant difference in fish landings between different quarters (Pillai, 1992). Therefore, the fishing period was divided into 4 quarters-namely Post-monsoon quarter (Sep-Nov), Winter (Dec-Feb), Pre-monsoon quarter (Mar-May) and Monsoon (Jun-Aug), to observe the biomass index and seasonal variation in catch (Carson, 2009).

Palghar is a district in northern Maharashtra state in western India. It is bounded by Thane and Nasik districts on the east and north-east. On the North, it has Valsad district of Gujarat state and Union territory of Dadra and Nagar Haveli. The Arabian

Sea forms the western boundary while Vasai-Virar is a part of Mumbai Metropolitan region. The total geographic area of the district is 5,344 sq. km. It is located on 19.697029°N and 72.771249°E. It comprises the wide amphitheatre like Ulhas basin on the south and hilly Vaitarna valley on the north together with plateaus and the slopes of Sahyadri. The present study deals with the comparison of biomass index of selected fishes and few rare species found in selected area.

### MATERIAL AND METHODS:

#### a) General information about the selected area:

For the proposed study of biomass index, two fish landing centers were selected from Palghar district- Arnala and Satpati. Arnala is a small fishing village about 17 km from Virar station and one of the doll-net centers of Palghar district. At Arnala, approximately 375 doll nets are operated and the operation is generally confined to a depth range of 18-22 m.

Satpati is one of the biggest fishing villages which is about 10km from Palghar. It is a Taluka headquarter in Palghar district of Maharashtra. About 90% families over there are the fishermen. About 380 boats including 280 mechanized gill netters, 60 mechanized doll-netters and 40 non-mechanized small boats operate at this center. Both the surface set and the bottom set gillnetters observe a fishing trip of 3-6 days. This center is important for pomfret landings. Generally, the bottom set gillnets are used from September to December and the surface set gillnets from December to August.

**b) Methodology:**

The study included identification of the species, interviews and discussions with the local catchers and different community head of fisheries association. This paper analyses the fish population estimates produced by random sampling methods conducted simultaneously and in spatial proximity (Chindah, 2001; Dimitra and Ioanna 2010; Fischer and Eckmann, 1997; Kimmerer, 2005; Stergiou A,

1997). The selected sites were visited at a regular interval of time of 3-5days. The studies were carried out during the period of one year from September 2013 to October 2014 as shown in Table No.1. The study included identification of the species, interviews and discussions with the local catchers, different community Head of Fisheries Association.

**OBSERVATIONS AND DISCUSSIONS:**

**1) Fishing Days:**

At Arnala and Satpati, the number of annual fishing days is same i.e. 254 for the referred period. A minimum of 15 fishing days were observed in monsoon and a maximum of 67 fishing days in winter. Month-wise comparison of number of fishing days shows that there were only 22 fishing days in September 2013 and 25 fishing days in Sep and Oct 2014 whereas other months has 13-24 fishing days each. During monsoon, there were 15 fishing days in the month of August as shown in Table No. 2.

**OBSERVATIONS AND TABULATIONS**

**Table No. 1 (a): Month-wise distribution of fishing days and catch in kg at ARNALA COAST and Satpati (2013-2014).**

<i>Quarter</i>	<i>Months and year</i>	<i>No.of fishing days</i>	<i>Value of Catch in kg (Pomfret)at Arnala Coast</i>	<i>Value of Catch in kg (Bombay duck) at Arnala Coast</i>	<i>Value of Catch in kg (Pomfret) at Satpati Coast</i>	<i>Value of Catch in kg (Bombay duck) at Satpati Coast</i>
<b>1) Post-Monsoon</b>	Sep'13	22	27665	60999.80	27665	60999.80
	Oct'13	19	45599.500	48687.55	45599.500	48687.55
	Nov'13	13	30222.450	41345.55	30222.450	41345.55
	<b>Total</b>	<b>54</b>	<b>103486.95</b>	<b>151032.9</b>	<b>103486.95</b>	<b>151032.9</b>
<b>2) Winter</b>	Dec'13	22	7865.800	34549	7865.800	34549
	Jan'14	22	No fishing	339.870	No fishing	339.870
	Feb'14	23	2900.200	1400	2900.200	1400
	<b>Total</b>	<b>67</b>	<b>10766</b>	<b>36288.87</b>	<b>10766</b>	<b>36288.87</b>
<b>3) Pre-Monsoon</b>	Mar'14	24	4500	2263.200	4500	2263.200
	Apr'14	24	20556.679	6600.100	20556.679	6600.100
	May'14	20	3230.280	2440.600	3230.280	2440.600
	<b>Total</b>	<b>68</b>	<b>28286.959</b>	<b>11303.90</b>	<b>28286.959</b>	<b>11303.90</b>
<b>4) Monsoon</b>	June'14	Nil	No fishing	No fishing	No fishing	No fishing
	July'14	Nil	No fishing	No fishing	No fishing	No fishing
	Aug'14	15	8686.800	37515.00	9006.800	42378
	<b>Total</b>	<b>15</b>	<b>8686.800</b>	<b>37515.00</b>	<b>9006.800</b>	<b>42378</b>
<b>5) Post-Monsoon</b>	Sep'14	25	30,382.30	70198.50	25,780.30	60390.26
	Oct'14	25	23,615.80	42690.50	24000.900	32890.50
	<b>Total</b>	<b>50</b>	<b>53998.100</b>	<b>112889.0</b>	<b>49781.200</b>	<b>93280.76</b>

**Table no. 1 (b) Graphical representation of month-wise distribution of fishing days and catch at Arnala centre and Satpati centre (2013-2014).**

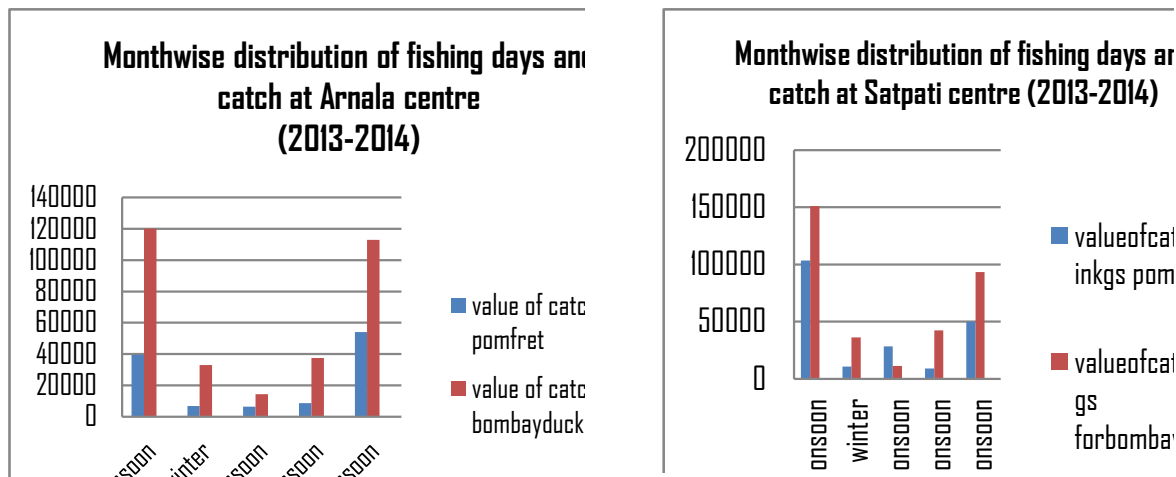


Table No. 1 (c) Pie diagrams showing Quarter wise production of Bombayduck and Pomfret catch at Arnala center (2013-2014).

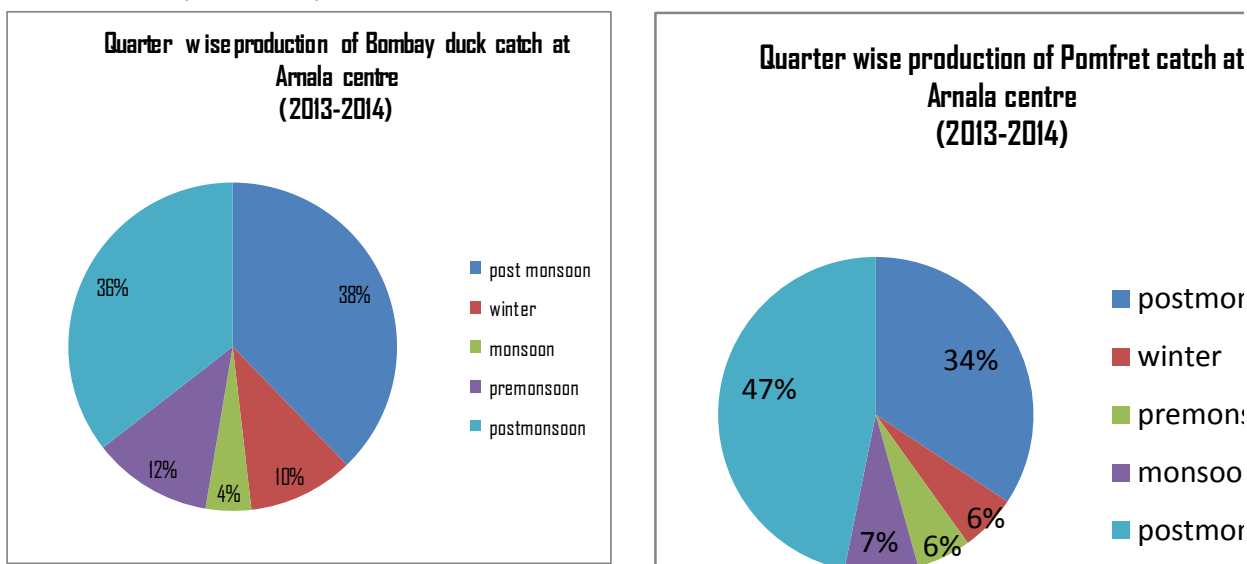


Table No.1 (e) Pie diagrams showing Quarter-wise production of Bombay duck and Pomfret catch at Satpati center (2013-2014)

**2) Catch composition:**

The catch at both the centers mainly comprise Pomfret and Bombay duck. But some rare species were also found in number during the annual catch. It is mentioned in Table No.3. Similar findings were observed in earlier studies (Bordoloi, 2014; James and Alagnrswami 1991).

It has been observed that, Pomfret was the main species contributing 64% of the annual catch at Satpati center whereas 36% at Arnala center. Therefore, it can be concluded that Satpati center is the main site for pomfret landing. Another major species, Bombay duck contributed 51% of annual

catch at Satpati center whereas 49% at Arnala center (refer Table No.5). Among these species, there were also some rare species found during the catch annually at both the center. Whiptail sting ray contributes 3%, Yellow-fin tuna contributes 22%, Indian dog shark contributes 4%, Indian salmon contributes 11% and Ghol contributes 60%. The annual number of fishing days calculated was 254. It was also found that the total catch of fishes were maximum at Satpati center as compare to Arnala. Hence, Satpati is the largest fishing village in Palghar district. (Refer Table No.4)

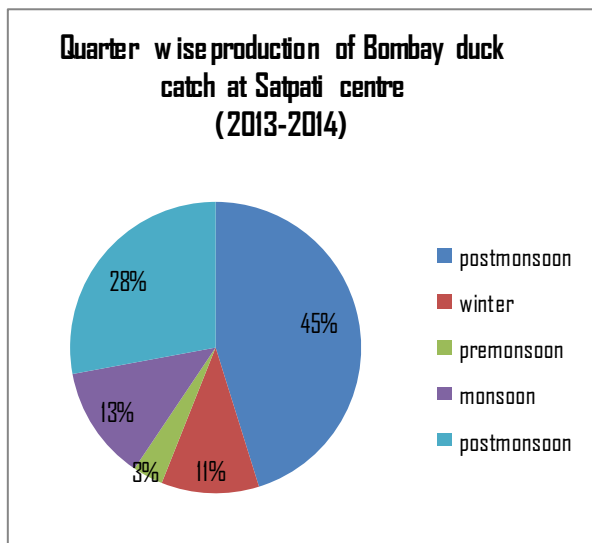


Table No. 2 (a) Graphical representation of total no. of annual catch in kg

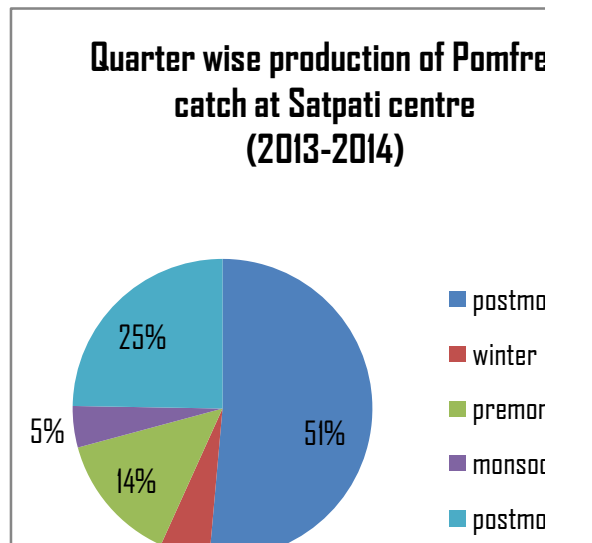
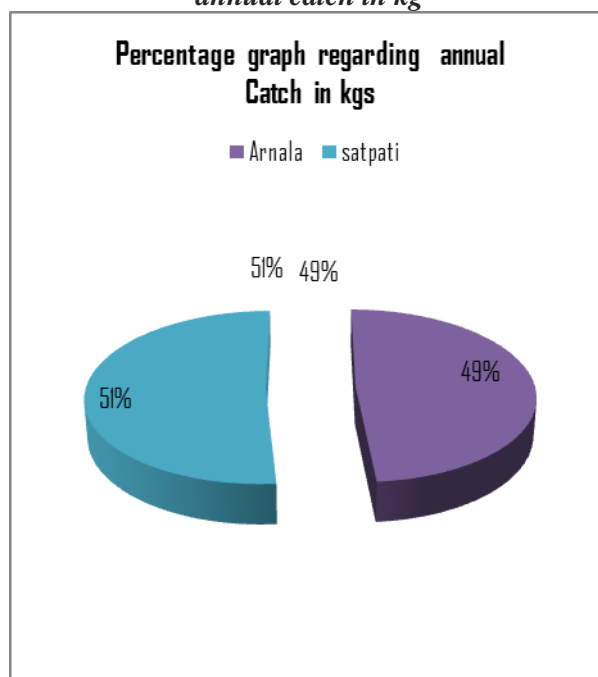
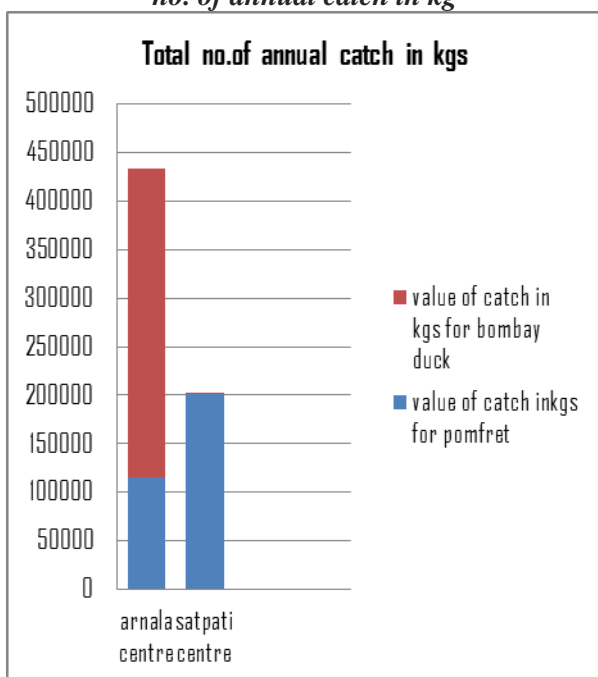


Table No. 2 (b) Percentage graph regarding annual catch in kg



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in %		
Scientific Name	Common name	No. of Catch month wise in %
<i>Protonibeadiacanthus</i>	Ghol	60
<i>Eleatheronematetra dactylum</i>	Indian salmon	11
<i>Scoliodonlaticaudus</i>	Indian dog shark	4
<i>Thannusalbacares</i>	Yellowfin tuna	22
<i>Himanturabilekeri</i>	Whip tail stingray	3

catch of rare fish species at Arnala and Satpati centre(2013-2014).

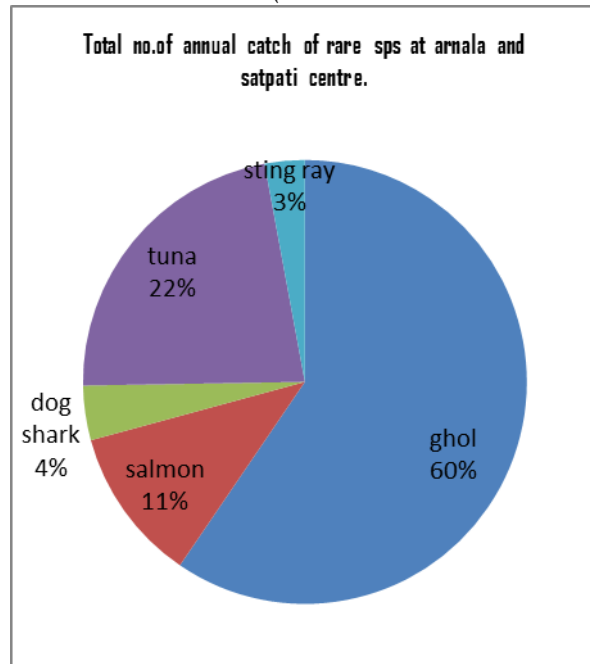
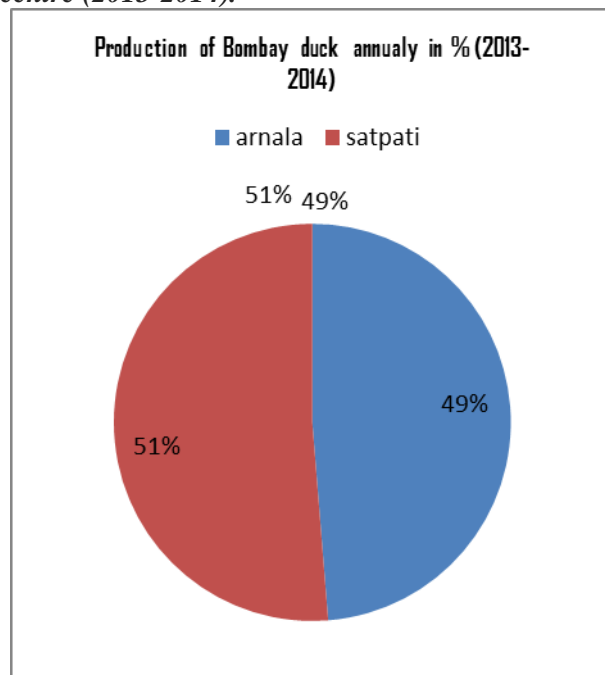
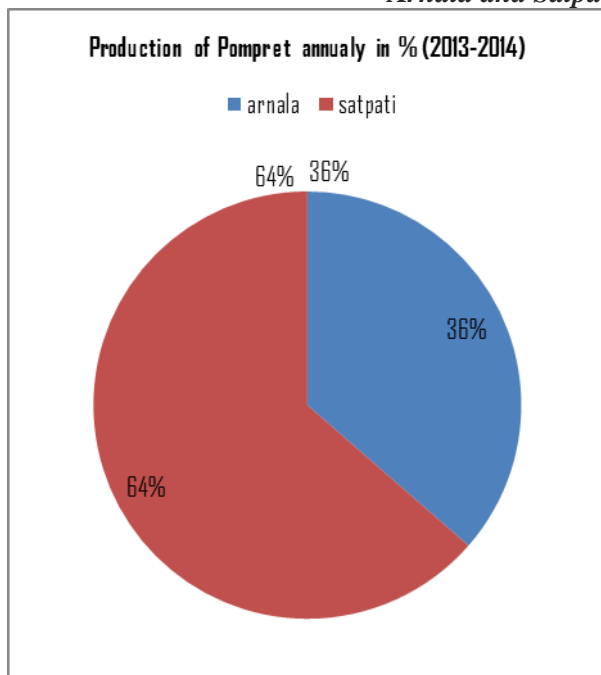


Table No. 5: Pie diagram showing Percentage-wise production of Pomfret and Bombay duck at Arnala and Satpati centre (2013-2014).



Dimitra C.B and Ioanna S, 2010. Seasonal variation of fish abundance and biomass in gillnet catches of an East Mediterranean lake: Doirani. *Journal of Environmental Biology*, 31(6): 995-1000.

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