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Dominant Fishery Resources along the Sites of Estuaries of Ratnagiri Coast of Maharashtra, India

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Abstract: *In the present study dominant fishery resources were studied along the sites of Ratnagiri. It was found that each site shows diversity of faunal components. Total 48 dominant fishery resources have been recorded with their local name from every study sites. The piece of work is significant with respect to mangrove species composition of specific site and fishery components. The occurrence of mangrove species along with faunal components were studied site wise. Ten major sites were explored for fishery resources to find out major faunal components associated with mangroves.*

Keywords: Sonneratia alba, Ratnagiri, Etroplus suratensis

I. INTRODUCTION

The importance of fisheries continues to rise as coastal populations are increasing and rapidly growing economies are driving up demand for fish. Global demands for fish products has increased dramatically over recent decades. Fishing is an important livelihood, globally providing employment to 38.4 million people whom 90% are employed in small scale fisheries (FAO, 2012)

The review on fishery resources provides a deep exploration of the importance of mangrove for wild capture fisheries. While mangrove are widely recognized for their role in enhancing both small scale and commercial fisheries, however they are rapidly disappearing.

Mangrove ecosystem increase fish production by two major mechanisms- the provision of food and shelter. It is a fact that mangrove forests are highly productive, with mean levels of primary productivity close to average for tropical terrestrial forests. Their leaves and woody parts (detritus) form a key part of the marine food chain that supports fisheries. Decomposers of detritus include food chain microorganisms such as bacteria and oomycetes as well as some commercially important crab species. The decomposers process the leaves and woody matter into fine palatable fragments for other consumers.

Mangrove productivity is further enhanced by productivity of marginal organisms like periphyton and phytoplankton occurring on mangrove trees, in their soil and in water column, which have lower rates of productivity but are nutritionally important to consumers (Nugraha1,2020). Mangroves also benefit from approaching nutrients from river and other neighboring natural surroundings. They may also export supplements, as disintegrated and particulate natural carbon, living biomass, hatchlings and developing fish and such as mangrove crabs, prawns, mullets; filter feeding bivalves, higher consumers such as mud crabs and other fishes. It is not only the high productivity of the mangroves that creates value for fisheries, but also their physical characteristics. Mangrove roots and trunk structure where oysters can grow on. The roots also trap fine particles creating soft soils and ideal for mollusks and crustaceans to burrow in. Mangrove species also provide shelter for many faunal species use mangrove habitat as nursery grounds. Before moving to seaward habitats, the species spend their time in mangrove as a juveniles.

The fish communities in the mangroves have been of much interest, as many of the fishes are commercially important. Many commercially important fishery components like finfish, shelfish and others derive from mangrove detritus. Mangrove ecosystem is good nursery breeding centre for larvae of economically important species like prawns, crabs and many fishes. Based on earlier reports it was thought to fill up some of the gaps from the coast of Ratnagiri. This kind of work will help the planners and workers for sustainable fisheries.

Bhosale (1990) listed 30 species of fish from Ratnagiri coast. Sathe (1991) reports 22 species and Kurlapkar (1993) recorded 35 species. The present study is attempted along the coast of Ratnagiri where 10 major sites were explores

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for fishery resources to find out major faunal components associated with mangroves. The distribution and occurrence of mangrove species were studied site wise along with estuarine fishery resources.

II. MATERIAL AND METHODS

Observations on faunal components were made by the direct visual method along the study sites. Local fishery markets were surveyed for all sites season wise. The information regarding fishery resources was collected. Local fishermens and fisher womens were also interviewed. Visits were also made to the sites where fishermen capture the faunal components. The questionnaire was made on the basis of their seasonal distribution, species composition, availability of various faunal species season wise, price in market of prawns, crab, molluscs, bivalves,shrimp etc. The fishes and other faunal components have been identified with the help of experts from fishery college, Shirgaon (Ratnagiri) up to the genus level also by referring books, manuals authentic literature related to fishery.

2.1 Study Area

For the present study total 10 sites were selected from Ratnagiri and surrounding area. The description of the sites and observation of mangrove species composition is as follows

A. Are

It is one of the estuary belong to Ratnagir district. It is located at $17^0$04.370 N and $073^0$17.692 E. It is formed by the two small rivers namely Kusum and Agni. It is situated at north from the Ratnagiri city by 7 km distance. The length of estuary is 3 km. It is very small village with less population. This village comes under the Kalbadevi grampanchayat. Mangrove vegetation is well grown and mix type. Basani,Dhamewadi, Muslimwadi and Sadaye are the villages. Plants like *Rhizophora, Lumnitzera, Sonneratia, Avicennia* are growing in well **(Plate-1)**

B. Bhatye

It is situated at $16^0$59.244' N and $073^0$18.351' E. The mouth of estuary is just 4 km from Ratnagiri city towards the south. It is 14.3 km in length and stream in the direction of east-west. It is one of the largest estuary. The stream of Kajavi flows to a separation of 15 km in its water course. It is a huge estuary encompassed by many villages along the banks of neighbouring Ratnagiri city. The cover of mangrove starts from the mouth region and distributed along the south and north banks. The water directs in the centre region is significantly wide and ends up plainly limit towards the upstream. It is one of the navigational centre. There are three mangrove islands with dominant species viz.*Rhizophora mucronata, Rhizophora apiculata, Kandelia candel*and *Avicennia* sps. **(Plate-1)**

C. Chinchkhari

It is located at 17^0 01.614 N and $073^0$16.544 E. It is 7 km away from the Ratnagiri town. It comes under the Someshwar grampanchayat. Geographical area of Chinchkhari is about 457.78 hectares. It is situated along the south bank and east site towards the Chinchkhari village. The greater Part of this site is recovered by developing bund and construction of road in the mangrove area. The eastern side of this site there is channel which receives fresh water. This site is mostly dominated by the *Rhizophora apiculata* towards land word side few patches of *Kandelia candel,Sonneratia alba* and *Rhizophora mucronata* exist **(Plate-2)**

D. Karla

It is located at$16^0$58.157 N and $073^0$18.483 E. It is 3 km away from the Ratnagiri. It is surrounded by villages like Ambeshet, Juve. Along the west and east coast it is covered by the mangrove vegetation. It is dominated by the mix vegetation of mangroves. It is situated along the north bank of Karla village. Towards the west side some portion of this site is shallow with sloppy substratum. The entire zone is dirtied by sewage from the thicky populate. The site is dominated by species like *Sonnerati alba, Avicennia officinalis***(Plate-2)**

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E. Jaki Mirya

It is located $16^{0}58.128$ N and $073^{0}19.503$ E. The aggregate geographic zone of Jaki Mirya town is 160.21 hectares. Jaki Mirya is divided into two small villages i.e.Jaki Miya and Sada Mirya. This village is surrounded by the Arabian Sea.Jaki Mirya is situated between the Miryatowards the north side and Sada Mirya towards the south. Mirya site shows the vegetation of mangroves in Jaki Mirya and Sada Jaki Mirya. The population of mangrove is dense towards the mouth region of Arabian sea **(Plate-3)**

F. Narayanmali

It is situated at $16^{0}58.989$ N and $073^{0}18.046$ E. Along the north region of main stream it has a narrow strip of mangrove vegetation. It comes under the Nachane grampanchayat. The diversity of mangrove species is comparatively rich at Narayanmali.It is located 4 km away from the Ratnagiri. Pomendi khurd, Pomendi budruk , Karla are the nearby villages to Naraynamali. Near the Narayanmali village there is basin area which is dominated by luxuriant patch of *Sonneratia alba, Rhizophora apiculata, Ceripos tagal, Exocoecaria agallocha, Aegiceras corniculatum,Rhizophora mucronata* are growing well. **(Plate-3)**

G. Juna Phansop

It is located at $16^{0}57.427$ N and $073^{0}18.726$ E. It is approximately 7 km away from Ratnagiri city. It comes under Phansop grampanchayat. The mangrove vegetation is present along the bank of Phansop towards the northwest. The site is mainly populated with fishermen. *Sonneratia alba* is dominant species along this area. The site is inundated daily towards the west **(Plate-4)**

H. Nava Phansop

It is located at 16^{0} 57.552 N and $073^{0}19.006$ E. It is 9 km away from Ratnagiri city. The mangrove vegetation is present along the bank towards the north and south. It is surrounded by Sangmeshwar taluka towards east, Guhaghar taluka towards north, Rajapur taluka towards east. The substratum is shallow and muddy. Bhatye, Karla,Nachane and Admapur are the nearby villages to Nava Phansop. The site is inhabited with *Avicennia marina, Avicennia officinalis* and *Rhizophora* **(Plate-4)**

I. Rajiwada

It is an island closed by the mouth. It is located at $16^{0}58.988'$ N and $073^{0}18.047$ E. It is one of the important fishery center. The substratum at this region is shallow and muddy. During high tide the area filled by water due to which the substratum is deep muddy. The islands faces the tidal water flowing with high speed and tides. Towards the east south Navakhol site is situated. Rajiwada site is just opposite to Bhatye site. It comes under the Ratnagiri Nagar parishad **(Plate-5)**

J. Sakhartar

It extends between $17^{0}04.372$ N and $073^{0}17.689$ E. It is 9 km away from Ratnagiri. The village is situated at the bank of Sakhartar estuary towards west side. The mangrove vegetation is present near the bridge. The site shows rich diversity of *Sonneratia alba* big tree along northeast and south east side. It comes under the Kasarveli grampanchyat. Due to large population the estuary is always filled with domestic sewage. At the southern border it comes shallow. Along with *Sonneratia alba, Avicennia marina, Avicennia officinalis,Rhizophora mucronata* and *Avicennia marina* dwarf are plants distributed. **(Plate-5)**

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PLATE-1

ARE SITE

BHATYE SITE

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PLATE-2

CHINCHKHARI SITE

KARLA SITE

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PLATE-3

Jaki Mirya site

Narayanmali site

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PLATE-4

JUNA PHANSOP SITE

NAVA PHANSOP SITE

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PLATE- 5

RAJIWADA SITE

SAKHARTAR SITE

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III. RESULTS AND DISCUSSION

48 total faunal components were recorded from the study sites (Table-1). A major fishery component includes fishes, crabs, shrimps, molluscs, bivalves mainly. In the coastal regions of India commercially important fishery resources are mainly demersal finfish, prawns and catfishes (Singh *et al.*,2012).

Table 1: Checklist of faunal resources along the sites of Ratnagiri coast

Sr. No.	Fishery resources	Common name	Local name
1.	*Acanthopragus berda* (Forsskal, 1775)	**Goldsilk seabream**	**Khadak Palu**
2.	*Acanthopargus latus* (Houttuyn,1782)	**Yellowfin seabream**	-
3.	*Ambassis* sp. (G.Cuvier,1828)	**Glassifsh**	**Kachki**
4.	*Anodontostoma chacunda* (Hamilton, 1822)	**Chacunda gizzard shad**	**Gubir**
5.	*Babylonia* sp.(Schulter,1838)	**Sea snail**	-
6.	*Caranx* sp. (Lacepede, 1801)	**Kingfish**	**Shitap**
7.	*Cerithidea cingulata* (Gmelin,1791)	-	-
8.	*Cynoglossus* sp.(F.Hamilton,1822)	-	-
9.	*Drepane punctata* (Linnaeus,1758)	**Spotted sickle fish**	**Chand**
10.	*Epinephelus* sp.(Bloch,1793)	-	**Gobra**
11.	*Etroplus suratensis* (Bloch,1790)	**Banded pearl spot**	-
12.	*Gerres filamentosus* (Cuvier,1829)	**Whipfin silver biddy**	**Charbot**
13.	*Hemiramphus* sp.(G.Cuvier,1816)	-	-
14.	*Leiognathus* sp.(Lacepede,1802)	-	-
15.	*Lutjanus* sp.(Bloch,1790)	-	-
16.	*Lutjanus johnii* (Bloch,1792)	**John's snapper**	**Chavari tamb**
17.	*Mugil cephalus* (Linnaeus, 1758)	**Flathead mullet**	**Boi**
18.	*Osteogeneiosus militaris* (Linnaeus,1758)	**Soldier catfish**	**Shingala**
19.	*Platax pinnatus* (Linnaeus, 1758)	**Shaded batfish**	**Kavala**
20.	*Platycephalus indicus* (Linnaeus,1758)	**Bartail flathead**	**Mench**
21.	*Rhingobius* sp.(T.N.Gill,1859)	-	-
22.	*Sardinella* sp.(Valenciennes, 1847)	-	-
23.	*Sardinella longiceps*(Valenciennes, 1847)	**Indian oil sardine**	**Kanat**
24.	*Scatophagus argus* (Linnaeus,1766)	**Butter fish**	-
25.	*Siganus* sp.	-	-
26.	*Siganus vermiculatus* (Valenciennes,1835)	**Vermiculated spine foot**	-
27.	*Sillago sihama* (Forsskal,1775)	**Silver sillago**	**Renvi**
28.	*Stolephorous commersonii* (Lacepede,1803)	**Commerson's Anchovy**	-
29.	*Scylla serrata* (Forsskal,1755)	**Mud crab**	**Kurla**
30.	*Portunus pelagicus* (Linnaeus,1758)	**Blue swimming crab**	**Kurla**
31.	*Portunus sanguinolentus* (Herbst, 1783)	**Three spotted swimming crab**	**Kurla**
32.	*Uca coarctata* (H. Milne Edwards, 1852)	**Fiddler crab**	**Kurla**
33.	*Meretrix meretrix* (Linnaeus, 1758)	**Asiatic hard clam**	-
34.	*Paphia* sp.(Roding,1758)	-	-
35.	*Paphia malabarica* (Dillwyn, 1817)	-	-
36.	*Pila* sp.(Roding,1798)	-	-

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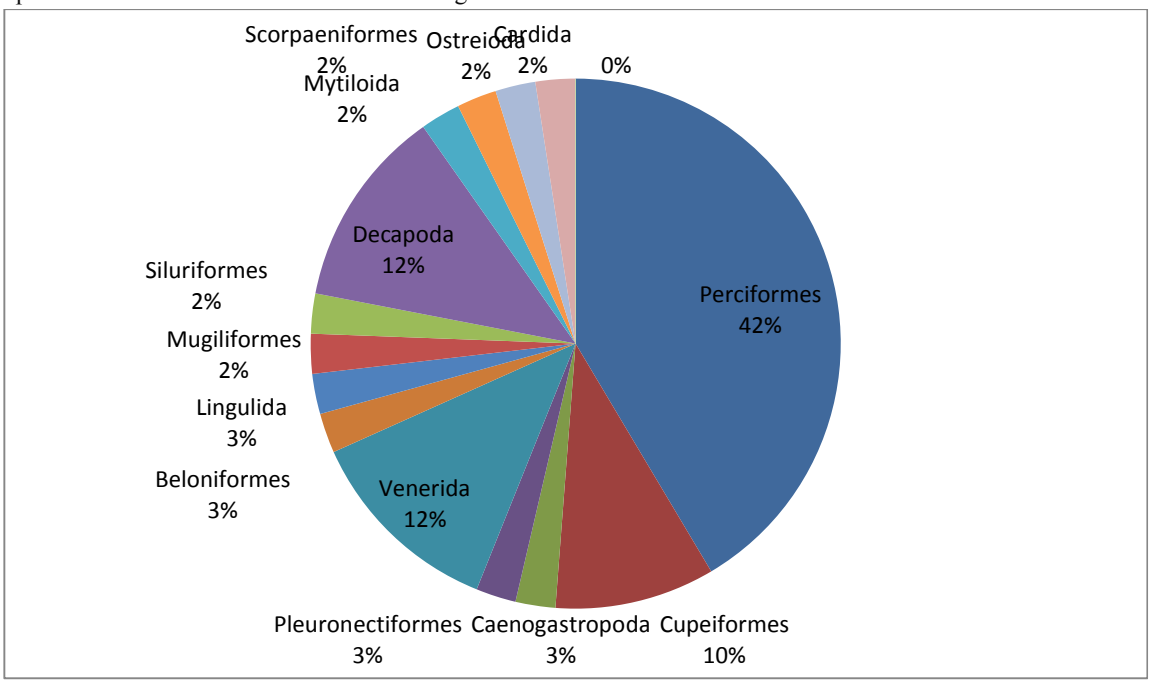
37.	*Nerita* sp.(Linnaeus, 1758)	-	-
38.	*Perna viridis* (Linnaeus,1758)	**Asian green mussel**	**Vakhunde**
39.	*Saccostrea cucullata* (Born,1778)	**Hooder oyster**	**Kalave**
40.	*Solecurtus scopula* (Turto, 1822)	-	-
41.	*Turitella* sp.(Lamarck, 1799)		
42.	*Telescopium telescopium* (Linnaeus,1758)	**Horn snail**	-
43.	*Polymesoda erosa* (Lightfoot,1786)	**Common Gelonia**	-
44.	*Gafrarium divaricutum* (Gmelin, 1791)	-	-
45.	*Cerithidea cingulata* (Gmelin,1791)	**Mud snail**	
46.	*Penaeus monodon* (Fabricius,1798)	**Tiger prawn**	**Kolambi**
47.	*Fenneropenaeus indicus* (H.Milne Edwards,1837)	**White prawn**	**Kolambi**
48.	*Lingula anatina* (Lamarck, 1801)	-	**Chirfal**

Faunal components of selected sites belongsto 14 orders and 34 families. 42 % faunal components are from order Perciformes. This is dominant order among the faunal resources (Table-53). It includes 17 species belonging to 12 families followed by order Decapoda (12%), and Venerida ((12%) (Figure.1). Perciformes is the abundantorder of the vertebrates involve 41 % of the bony fishes. The meaning of Perciformes is like perch. In aquatic system more than 10,000 species occur which belong to class of ray finned fish. An order Perciformes include 160 families in vertebrates (Nelson,2006).

Bivalve, molluscs from salt water as well as fresh water belong to order Venerida. It includes many familiar groups such as cockles and clams which have high value food.



Decapoda is order of crustacean species within Malacostraca class. It includes crayfish. Most of the decapods members are scavengers. Decapoda orderincludesabout 15, 000 species , 27,00 genera and around 3, 300 fossil species (Sammy *et al.,* 2009).

There are five faunal components are belongs to order Decapoda such as *Peaneus monodon, Penaeus semiculatus, Portunus pelagicus, Portunus sanguinolentus* and *Scylla serrata.*

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Clupeiformes is the order of ray finned fish. It belongs to family Clupeidae. There are total 4 fishes namely *Anodontostoma chacunda*, *Stolephorous commersonii*, *Sardinella* sp. and *Sardinella longiceps* from family Clupeidae. The order Clupeiformes includes 405 species in seven families (Froese *et al*., 2012; Lavoue *et al.,* 2013). There are four clupeidae members found along the site of Ratnagiri**.(Fig.1.)**

An order Scorpaeoniformes shows ray finned fish. It comprises more than 1320 species of bony fish belonging to 35 families (Willliam *et al.,* 1998, Froese *et al.,* 2006). *Platycephalus indicus* is only single genus in the order of Scorpaeoniformes which is found along the sites of Ratnagiri.

Ostereioda is the order of oysters contains two families namely Ostreidae and Grypheidae. *Crassostrea cucullata* is used as a food. During low tide the fishermen collect the specimens and then the mass of *Saccostrea* is removed with the help of knife. The preparations were made by localites. Extra catch of *Saccostrea cucullata* is sold in local market. This oyster member is very important source along the coast of Ratnagiri.

Lingula is monotypic species from the phylum Brachipod, order Lingulida and family Lingulidae. It is supposed to be fossils over 500 million years ago but among the few brachiopods it is surviving in nature.

The order Mytiloida is an order of bivalves, molluscs which are commonly known as green mussels. It belongs to family Mytilidae. A new classification system of bivalvia has been given by Bieler, Carter and Coan (2010). It includes the order Mytiloida with super family Mytiloidea. It is found worldwide on rocky shores in the intertidal zone and shallow subtidal areas. The shell of *Perna viridis* is thick and asymmetrical. It attaches themselves with the help of byssus to a solid substrate.

Caenogastropoda is a large diverse group of marine gastropod molluscs as well as include freshwater and land, marine and sea snails. It constitutes near about 60 % all living gastropods and many families of shelled marine molluscs including wentle traps, cone snails coueries etc. (Hayes *et al.,*2009).

The species in Plueronectiformes have been identified from the character like the pair of eye lies on one side of head and their face left or right side upward and other face side upward. It includes about 700 species from 11 families. The family Cynoglossidae is one of the families among the order Plueronectiformes. The present study indicates presence of *Cynoglossus* sps.along the coast of Ratnagiri.

IV. CONCLUSION

The diversity of all faunal components were recorded site wise. Ratnagiri fishery found to be declining day by day. It is necessary to conserve the mangrove species occurring by involving local people through community approach. Due to human encroachment like clear felling, construction of road which directlty affects the species which are under threat. Estuarine fishery is mainly depend on the occurrence of different types of mangrove species. So, there is need to protect the habitat of mangrove species.

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