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Coastal diversity of marine edible bivalve molluscs from Kegaon, West Coast of India

Sunil N Khade
Department of Zoology, P.N.College, Pusad, Maharashtra, India

Abstract
Maharashtra one is the rich in diversity of marine molluscs, the study were undertaken of marine edible bivalve from mangrove habitat which is provide nourishment and shelter, rocky substrata, and muddy habitat, of selected study sites of Raigad district coast, during October, 2014 to September, 2015, in this marine habitats a great scope and wide chance to research and balance the ecosystem there urgent need to conservation to these bivalves.

Keywords: marine bivalve, diversity, west coast of India

1. Introduction

Marine molluscs are recorded in India from the diverse habitats. They occur in different habitats such as mangroves, rocky coasts, coral reef, sandy beaches, sea grass beds and also at greater vertically deeper in the sea, they are more diverse in the rocky intertidal zone along the coast. Sandy stones, inter tidal flats, mangrove habitats [1]. Mangrove forest one of the biologically diverse ecosystems in the world, rich in organic matters as well as nutrients and it support to large biomass of biota [2]. The bivalves use to collect extensively for local consumption as a food. Mangrove roots & lower parts of trunks provide substrate for oysters and mussels, because these animals are filter feeders, they are confined to microhabitats below mean high water and are usually only abundant in areas adjacent to open water. The blood clams, *Anadara granosa* and other cockles can be found in huge numbers on mudflats in mangrove strands, where it lies partially buried in the sediment [3]. An oysters, mussels and clams serve the nutritional needs of the coastal population they are good source of minerals, protein, and glycogen which is easily digestible compared to other animal food (flesh) [4]. In India, till today, 5,070 species of molluscs have been recorded of which, 3,370 are from marine habitats [5]. The gastropods such as sacred chank, *Trochus*, *Turbo* are exploited from the Indian marine region [6]. Pirawadi and Karanja of Raigad district has greater diversity and commercial and food value [19]. The research papers investigate the diversity of bivalve molluscs of mangrove habitat, rocky coasts, sandy beach from selected study sites of Raigad coast which is 240 kms of Indian Coast.

2. Materials and Methods

a. **Nagaon:** (Lat. 18°51.994" North and Long. 072°56.355" East). The structure of study site is rocky open shore, about 10m rocky area open during low tide, black pebbles were present at the above high water mark, in scattered small mangroves trees of *Bruguiera sexangula* (Lour.) Poir. Were found, on the eastern side beside town is about 20-30m, due to nearest village there is domestic water discharged into the sea.

b. **Kegaon:** (Lat. 18°52.995" North and Long. 072°54.704" East). The rocky open shore, about 10-20m rocky area open during low tide, pebbles were present at the above high water mark on the western side, on the rocky pits and crevices two scattered mangroves trees of *Bruguiera sexangula* (Lour.) Poir., *Sonneatia alba* J. Smith**,** were recorded from mid tide to till high tide mark, on the northern side away from the high tide mark town is about 30-40m, due to nearest village domestic water discharged, no fishing activities.

c. **Mora:** (Lat. 18°54.676" North and Long. 072°55.445" East). The rocky open shore, about 10-20m on the rocky shore slightly mud mixed, small pebbles were present at the above of high water mark, in dense large mangroves trees of *Sonneatia alba* J. Smith, *Avicinia marina* (Forsk.) Vierh. were recorded, on the southern side away from the high tide mark town is about 10-20m, due to nearest village there is domestic discharged, due to fishing activities oil discharged.

d. **Panaje:** (Lat. 18°54.615" North and Long. 072°56.812 "East). The rocky open shore, below high tide mark about 60-70m marshy area open during low tide, rocky and pebbles were present at the above of high tide mark, above mid tide mark in scattered mangroves trees *Bruguiera sexangula* (Lour.) Poir. Were recorded, there is no domestic water discharged.

e. **Sheva:** (Lat. 18°55.739" North and Long. 072°57.214" East). The rocky open shore, about 10-20m rocky and muddy area opens during low tide, big black stones and pebbles were present at the above of high tide mark, in scattered large mangrove trees of *Avicinia marina* (Forsk.) Vierh., were present, JNPT about 40-50m away on the northern side from the high tide mark, no domestic water discharged, no fishing activities.

Live animals collected by handpicking including mangrove associated gastropods species during low tide. Five quadrates of nylon rope each 1-m² was prepared, randomly at each

locality just over the bed. Twice in each season post-monsoon, winter and summer October 2014 to September 2015. Soon after fishing, they were brought to the laboratory and the shells were brushed to clean the fouling biomass and mud. They were then stocked in filtered seawater pumped in the laboratory from the localities for observation then animal preserved in 70% alcohol for taxonomical identification of morphological characters of typical animal, especially, lunal, umbo, and operculum. Internal parts teeth. The shells were identified from Zoological Survey of India, Kolkata. Also using the following references: Annotated checklist of Indian Marine Molluscs (Cephalopoda, Bivalve and Scaphopoda) Part-1 Ramakrishna and A. Dey. Occasional Paper no. 320, ZSI -2010.

3. Results

According to "graph. 1". The study site Nagaon has recorded six species, Kegaon recorded five species, Mora has recorded five species, Panaje has recorded five species and Sheva has recorded six species. According to "graph. II" showing species from particular families, Arcidae belongs to one species, Mytilidae belongs to two species, Veneridae belongs to two species, Ostridae belongs two species and Anomiidae belongs to one species. According to "graph. III" there indicating from five orders belongs to five families and eight species from selected study sites of Raigad district coast during 2014-2015. Finally the *Placenta placenta* is recorded maximally only from Panaje site, also the oysters beds are dominantly recorded to all study sites which are commonly eaten by those are leaving along the coast.

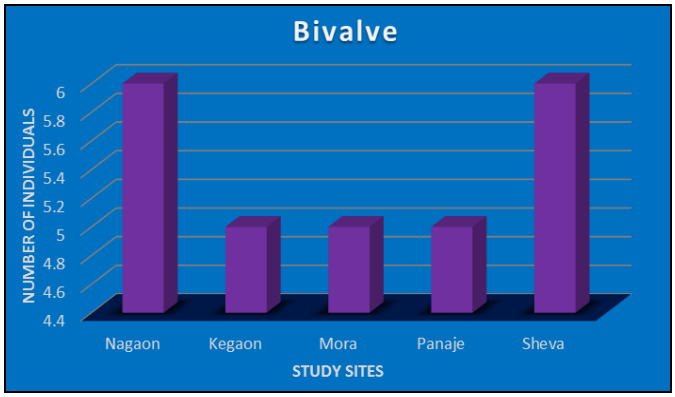

Fig 1: Bivalves recorded in number of individual/m² during 2014-15.

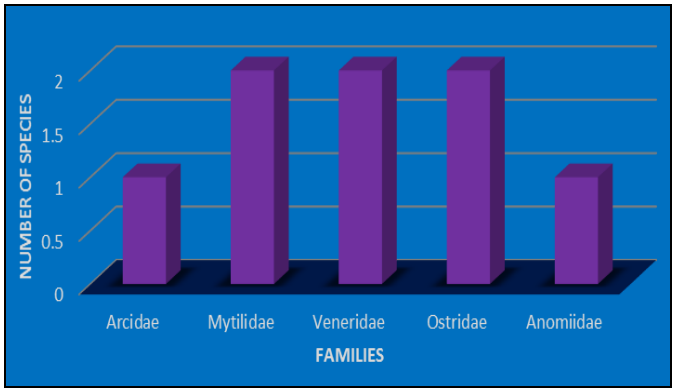

Fig 2: Bivalves recorded according to family during 2014-15.

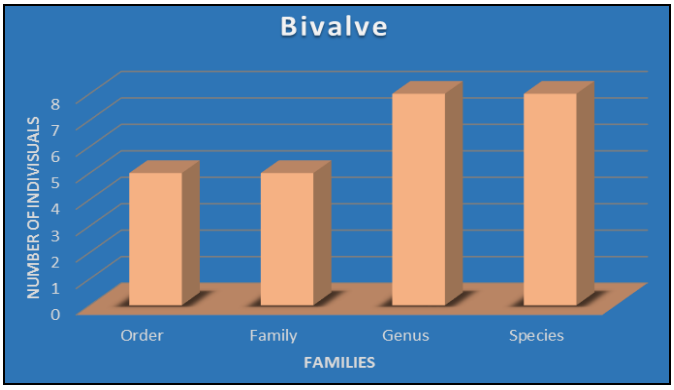

Fig 3: Taxonomical identification of bivalve during 2014-15.

4. Discussion

The gastropods diversity at five localities of Raigad district coast varies significantly. The pulmonate snail *Cassidula nucleus* has been studied from Pichavaram mangroves [8]. The *Nerita (Dostia) crepidularia* in vellar estuary mangroves, its having a variety of habitats mangroves plant on the stems, intertidal mudflat during the high tide time animals moving to plant stem after that during low tide time animals moving to mud flats [10]. The importance of ecology the relatively high temperature, high oxygen content, low wave energy [18]. The semi-enclosed nature of the habitat. Decomposed minerals of the plant litter from August onwards is an important component of nutrient cycling in wetlands & it harbours a large number of diverse species [7]. The lowest density was in the month of July because of monsoon season. In monsoon, due to self-dilution of the body fluid, the sensitive molluscs were unable to adjust the fluctuating osmotic balance quickly hence their mortality was high. After the month July because of adjustment, the mortality rate of molluscs decreased gradually. As a result, density of molluscs increased. It also understood that in the month of July, the salinity and temperature dropped down which made the condition adverse for the molluscs [10]. The population density was at its peak in the month of November during post monsoon period. It is clearly noticed by many research workers that the post monsoon period is the most favorable time for the new inflow of molluscan species. The mangroves support high density of every type of molluscan species especially, *Telescopium*, *Potamides*, *Natica*, *Nerita*, and *Littorina* and *oysters*. The *Littorina sp*. was densely found on the trunks, pneumatophores as well as on stilt roots of mangrove plants. It is good harvesting place for variety of molluscan species [7].

The gastropods are generally benthos organism and they are regularly used as bio-indicators of aquatic healthy. These species can produce a billion of larvae in the form of planktons that sustains the biotic population & they have an essential role in food chain, & energy flow. The observation of these species populations in mangrove ecosystem is important to evaluate their condition [11]. In the region of *Nerita (Dostia) crepidularia*, *Littorina sp*, *Cerithidea sp*, were observed to the mud banks, mudflats, mangrove forest, sandy muddy area swamps, prop-roots and pneumatophores. *Telescopium telescopium* were found in the mud flats of mangroves plants.

Mangroves are providing rich faunal resources from macro

faunal communities to microbial diversity. Molluscs can reach high biomass in mangroves ecosystem because of high primary production within the food web, as predators, herbivores, detritivores & filter feeders. The numerical abundance & biomass of molluscs can be equally impressive. The numerous investigation of mangroves associated molluscs in the world wide, 39 species recorded of gastropods in as Australian mangroves, [12]. 23 molluscs species from the mangrove forest in Hong Kong [13]. 44 sp., of Sematan mangrove forest of Malaysia recorded [14]. A total account of Sundarban 56 sp.of molluscs 31 gastropods & 25 bivalves [15]. 12 bivalve & 13 gastropods mangrove associated molluscs at Ratnagiri recorded [16] 39 gastropods belongs 15 families from Raigad district coast recorded [17]. Nagaon and Kegaon of Raigad district have probably have suitable habitat to support large number of edible molluscs diversity [20]. The order Neogastropoda is dominantly 08 species recorded during 2010-2011 [21]. Eight species of bivalves and twenty species from gastropod from selected study localities of Raigad Coast [22]. Twelve bivalves from seven families and thirteen gastropods from eight families recorded from Ratnagiri Coast [23]. The maximum number of molluscan species was observed from mud flats along the mangroves [24]. The order Archaeogastropoda has more diversity with five families and eleven species recorded [25] The Class gastropoda is typically one of the dominant and most conspicuous macrofauna in mangrove systems, it occupy huge range of ecological niches in the ecosystem.

5. Conclusion

At the site Nagaon and Sheva have greater diversity, at Panaje has recorded *Placenta placenta* dominantly, all edible bivalve species have great commercial, ecological as well as food value in the common people. The bivalve has a significant ecological role to play in the mangrove ecosystems too, also rocky and muddy habitats are suitable for these biota, and hence it is necessary to study of the diversity of bivalve molluscs from the Indian coast.

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