



Inventory of Molluscan fauna from the Mangroves of East Godavari District, Andhra Pradesh, India.

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Abstract: *Molluscs inhabit very diverse habitats like marine, estuarine, freshwater and terrestrial ecosystems. In mangrove ecosystem, they occupy all trophic levels in the food chain such as predators, herbivores, detritus, filter feeders, and play an important role in maintaining the health and productivity of the ecosystem. The diversity of molluscs has been studied at mangroves of East Godavari Estuarine waters. During the present survey, 15 species of molluscs were recorded. Among them 9 species are gastropods, 5 species are bivalves and 1 species is a slug.*

Key words : *Mangroves, Molluscan fauna, India, East Godavari, Bivalves, Gastropods.*

1. Introduction:

Mangroves are considered one of the most productive ecosystems in the world. They provide important habitats for rich biological diversity and play an important role in the estuarine and coastal food webs [1]. The diversity of macrofauna plays a crucial part in mangrove ecological systems and they are the main components in the food chain of mangroves. Through activities such as ingesting food and digging caves, these fauna relate with their neighboring environment. Furthermore, macrofauna community structure is the effective biological or ecological index to recognize environmental changes in mangroves [2]. These communities in high and low intertidal mangroves are often markedly different, and this relates in part to highly different environmental conditions. They appear to be influenced by hydro period, availability of organic matter and sediment characteristics [3].

The Macrofauna in mangroves may be separated in two groups, i.e., epifauna

and infauna. Epifauna refers to those invertebrates that live on various substrates such as lower tree trunks and the sediment surface, but which do not burrow in it on the other hand infauna burrows into the bottom sediments. A range of gastropods, crabs, and bivalve species are typical representatives of epifauna. [4] Of the many kinds of macro benthos associated with mangroves, molluscs have significant functions in estuarine ecosystem when compared with other organisms [5]. When compare with intertidal species mangrove species are differ in colour variability and movement patterns [6]. The molluscan fauna in mangrove habitats is composed of primarily bivalves and Gastropods [7]. Gastropods are characteristically one of the dominant and the most conspicuous fauna in mangroves, and occupy a wide range of biological niches [8].

In India, till today, 5,070 species of molluscs have been recorded of which, 3,370 are from marine habitats [9]. Dey (2006) mentioned that the Indian

subcontinent has about 100 molluscs associated with mangroves [10]. Boominathan *et al* (2012) reported 200 species of molluscs in mangrove habitats [5]. Subbarao *et al* (1983) have mentioned mollusc fauna of Muriganga estuary and Sunderbans [11]. Murthy & Balaparameswara Rao (1977) carried out some works on the ecology of molluscs of the mangrove swamps in Machilipatnam [12]. Studies on mangrove associated molluscan fauna of various Indian peninsular estuaries viz. Godavari and

Krishna estuaries [13], artificial mangroves of Pazhayar back water canal, Southeast Coast of India [14], Mahanadhi estuary [15], Mangrove ecosystem of Uran Raigad, and West coast of India [16] carried out by several researchers. Over two decades there is no comprehensive list of molluscan species found in East Godavari mangrove areas. Hence, the objective of this paper is to provide a comprehensive list of molluscs found in the East Godavari mangrove areas.

2. Materials and methods:

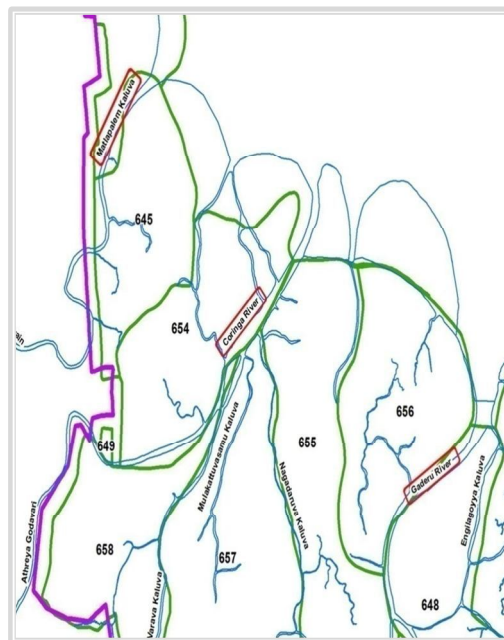
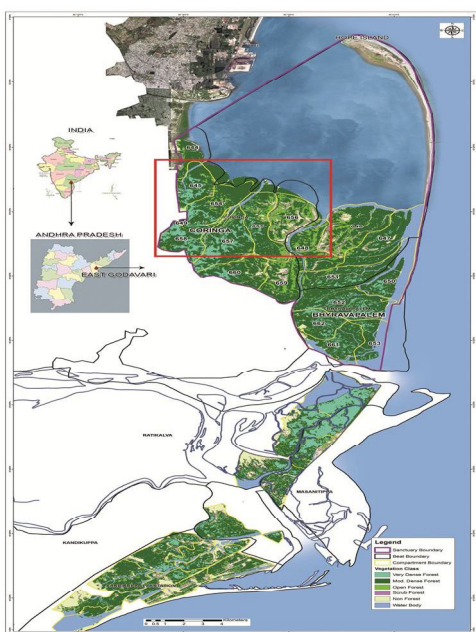


Fig 1. Study area shown in mangroves of East Godavari region.

A. Mangrove area map B. Places of sample collection

The Godavari mangrove wetlands are located between 16°30'-17°0'N and 82°10'-80°23'E in the East Godavari district of Andhra Pradesh. (Fig. 1) The East Godavari mangroves include the Coringa Wildlife Sanctuary and it has

three Reserve Forests, (RF) namely Coringa RF, Coringa Extension RF and Bhairavapalem RF. These mangrove ecosystems are connected to Kakinada Bay in the north and Gautami estuary in the south, through Coringa and Gaderu



creeks [17]. The mangroves of Coringa Wildlife Sanctuary receive tidal flushing through, Corangi River and Gaderu River which are the distributaries of Godavari River. The climate conditions of mangroves and its surroundings can be described as typical coastal climate, which is hot and humid. Generally, the temperature varies between 17°C to 40°C. The rainfall is mainly from South-west monsoon and occasionally from North-

east monsoon. The average rainfall ranges between 575mm and 1375 mm Yr⁻¹. Coringa mangrove ecosystem has a rich biodiversity of flora and fauna. There are 36 types of mangrove and its associates, 137 species of phytoplankton, 81 species of zooplankton, 126 species of microbenthos, 114 species of macrobenthos reported from this region [18].



a) *Nerita crepidularia*



b) *Nerita violacea*



c) *Assiminea brevicula*



d) *Cerithidea cingulata*



e) *Cerithidea obtusa*



f) *Telescopium telescopium*



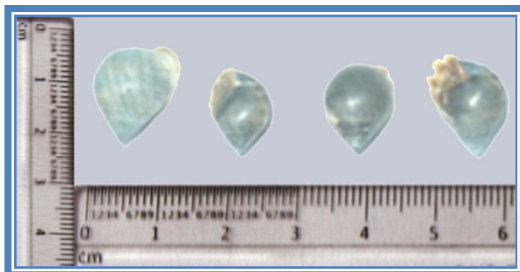
g) *Onchidium verruculatum*



h) *Cassidula nucleus*



i) *Ellobium gangeticum*



j) *Pythia plicata*



k) *Tegillarca granosa*



l) *Modiolous metcalfei*



m) *Crassostrea madrasensis*



n) *Saccostrea cucullata*



o) *Meretrix meretrix*

Fig. 2. Molluscan species of mangrove area of East Godavari

- | | |
|-----------------------------------|-----------------------------------|
| a) <i>Nerita crepidularia</i> | b) <i>Nerita violacia</i> |
| c) <i>Assiminea brevicula</i> | d) <i>Cerithidea cingulata</i> |
| e) <i>Cerithidea obtusa</i> | |
| f) <i>Telescopium telescopium</i> | g) <i>Onchidium verruculatum</i> |
| h) <i>Cassidula nucleus</i> | |
| i) <i>Ellobium gangeticum</i> | j) <i>Pythia plicata</i> |
| k) <i>Tegillarca granosa</i> | |
| l) <i>Modiolous metcalfei</i> | m) <i>Crassostrea madrasensis</i> |
| n) <i>Saccostrea cucullata</i> | |
| | o) <i>Meretrix meretrix</i> |

3. Methods of the Study:

The molluscan fauna of the mangroves were collected by hand picking and hand digging the substratum [19]. The arboreal forms were collected from the vertical stems, roots and other parts of the mangrove trees. [20]. Mussels and oysters were collected by scrapping with using knives. Molluscans collected from the mangrove trees, mud banks and wooden piles were identified based on morphological characters and taxonomic field guides.

4. Results and Discussions:

The study identified 9 species of gastropods, 5 species of bivalves and 1 species of sea slug (Fig -2). In the present investigation, the recorded specimens were mostly gastropods. These molluscs found to occur on mud banks, mud flats, mangrove forest, sandy muddy area swamps and hard substratum such as

wooden poles. Because of availability of food these species are adapted to different habitats [21]. Dious and Kasinathan(1994) studied the high dessication, salinity and temperature tolerances of snails from south Indian mangroves and reported that special conditions in the mangroves may result in local adaption of snails.[22] Jiang and Li (1995) found that density and biomass of molluscs were consistently highest in the high tide zones and decreased with depth [23]. They also found that species abundance increased with salinity in Chinese mangroves. The sensitivity of molluscs to their physical or chemical environment makes them good bio indicators [24].

There were 39 species of gastropods identified by camilleri (1992) in Australian mangroves [25]. Wells reported 23 mollusc species from Hong kong (1990) mangrove forest [26]. Jiang



and Li found 26 species in Chinese mangroves [27]. A total account of 56 species of molluscs including 31 gastropods and 25 bivalves were recorded in Sundarban mangroves [28]. Numerous surveys on mangrove molluscs were reported by several scientists in India. [29-37]. Maximum number of species was recorded from mud banks and mud flats. The results of observation in coringa mangroves showed that Gastropod species like *Cerethidea obtusa*, *Telescopium telescopium* and *Cerithidea cingulata* were highly dominant and distribution probably due to their mobile characteristic. The distribution of these species within a mangrove forest is influenced by a variety of factors such as light, tidal exposure, salinity, and substrate type. They feed on epibenthic crusts on stems and roots, and some species have been reported to feed on mangrove litter and propagules. *Nerita crepidularia*, *Nerita violacea* were found to attach on to the mangrove stems and branches up to 1.5 meter height. Species

like *Pythia plicata*, *Cassidula nucleus* were found occurring in the muddy substratum as well as on the stem and root system of mangroves along various tidal marks of the study area. Onchidium species also found most common in these mangroves. It is a mangrove slug that climbs on mangrove trees.

In Coringa mangroves bivalves play a crucial role and may contribute significantly to the organic biomass in the habitat. These are the link between phytoplankton communities and higher trophic levels [38]. Bivalves like *Tegillarca granosa* and *Meretrix meretrix* were found in muddy substratum and intertidal regions of mangroves. Oysters like *Crassostrea madrasensis* and *Saccostrea cucullata* were found attached to wherever hard substratum is available such as wooden pole, wooden boat, mangrove stem, rock, brick, cement pillar etc.

Systematic List of Molluscan fauna Recorded in East Godavari Mangroves

Phylum : Mollusca

CLASS	SUB CLASS	ORDER	FAMILY	GENUS	SPECIES
Gastropoda	Prosobranchia	Archaeogastropoda	Neritidae	Nerita (Dostia)	N. crepidularia (Lamarck, 1822) N. violacea (Gmelin 1791)
		Littorinimorpha	Assiminidae	Assimineia	A. brevicula (Pfeiffer, 1855)
		Caenogastropoda	Potamidae	Cerithidea	C. cingulata (Gmelin, 1791)
				Cerithidea	C. obtusa (Lamarck, 1822)
				Telescopium	T. telescopium (Linnaeus, 1758)
		Heterobranchia	Systellommatophora	Onchidiidae	Onchidium
	Pulmonata	Bassomatophora	Ellobiidae	Cassidula	C. nucleus (Gmelin, 1791)
				Ellobium	E. gangeticum (L. Pfeiffer, 1855)
				Pythia	P. plicata (Ferussac, 1821)
				Tegillarca	T. granosa (Linnaeus, 1758)
Pelecypoda (Bivalvia)	Pteriomorpha	Arcoida	Arcidae		
		Mytiloidea	Mytilidea	Modiolus	M. metcalfei (Hanley, 1843)
		Ostreoida	Ostreidae	Crossotrea	C. madrasensis (Preston)
	Heterodonta	Eulamellibranchiata	Veneridae	Saccostrea	S. cucullata (Born, 1778)
Meretrix				M. meretrix (Linnaeus, 1758)	



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