CRAB DIVERSITY IN MANGROVE AND COASTAL ECOSYSTEM

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***Abstract*– Crabs form an important part of mangrove and coastal ecosystem. They feed on leaf litter and other organic matter and play an important role in recycling of nutrients. Their digging behaviour results in changes of surface topography, distribution of particle size and degree of aeration in both ecosystems. The present study is on the abundance of crab species in two sites; Chithrapu village located north-east of Mulki ($13^0$03'49.4^{0}N, $74^0$46'56.6E) Dakshina Kannada, well known for mangrove ecosystem where the river Nandini meets Arabian Sea which is 30km from Mangaluru and the costal ecosystem near NITK, Surathkal ($13^0$00'12.6N, 74.47'22.1E) which is 18 km from Mangaluru. The temperature in both the sites which varied from 23^0 to 30^0C.A total of 14 species of decapods was recorded belonging to the families Portunidae (6 species), Grapsidae (3 species), Sesarmidae (2 species), Ocypodidae (1 species), Xanthidae (1 species) and Dotillidae (1 species). Most common species at Chitrapu were *Scylla serrata, Metopograpsus messo, Uca annulipes, Sesarma bidens, Metopograpsus latiforons, Sesarma qudratum*, *Diogenes pugilator*, whereas common species of NITK beach were *Dotilla myctiroides, Grapsus albolineatus and Ozius tuberculosis. Uca annulipes* belonging to family Ocypodidae. Further studies are carried on to know the crab diversity and richness in diversity.**

Keywords*– Decapods, mangroves, costal ecosystem, diversity and richness

INTRODUCTION:

Mangroves are unique as they support tropical coastal vegetation and they support genetically diverse groups of terrestrial and aquatic organisms. They are of great ecological and economic significance in the coastal region and also helps in enhancement of water quality (Kathiresan and Bingham, 2001; Kathiresan 2003). Among the various organisms found in the region, crustaceans make up the majority. These crustaceans exhibit remarkable adaptability which has led to their exceptional evolutionary history. Among the crustaceans decapod crabs are the most predominant with them being highly active animals with complex behavioural patterns (Pradnya *et al.,* 2011*)*.The crabs depend on the mangroves for survival and their litter have a significant role in the detritus formation. These moves around and live in borrow. This digging activity causes alterations in the surface topography, the grain size and facilitates the aeration of soil (Pradnya *et al.,* 2011*)*. The crabs are used as feed in aquaculture. It is a part of many cuisines. In duck farms it has been noticed that addition of crab powder to the feed not only stimulates the growth but also increase their spawning rate. The haemolymph of crabs are also used in the production of certain drugs and in devices used in medical care (Varadarajan *et al.,* 2012). Prandya *et al.* (2011) studied diversity of mangrove crabs in Karwar mangrove forest, Kali estuary and recorded 13 species. Joel *et al.*,(1985) studied zonation and distribution in Pulicate Lake and reported 29 species. The present study deals with the comparative account of abundance of crab species in these two ecosystems.

MATERIALS AND METHODS:

STUDY AREA:

The study site includes Chithrapu village ($13^0$03'49.4^{0}N, $74^0$46'56.6E) which is located north east of Mulki, Dakshina Kannada. It is well known for Mangrove ecosystem where the river Nandini meets with the Arabian Sea (30 km away from Mangalore) and NITK beach, Sursthkal ($13^0$00'12.6N, 74.47'22.1E) which is 18km from Mangaluru, Dakshina Kannada (Fig 1 and 2)

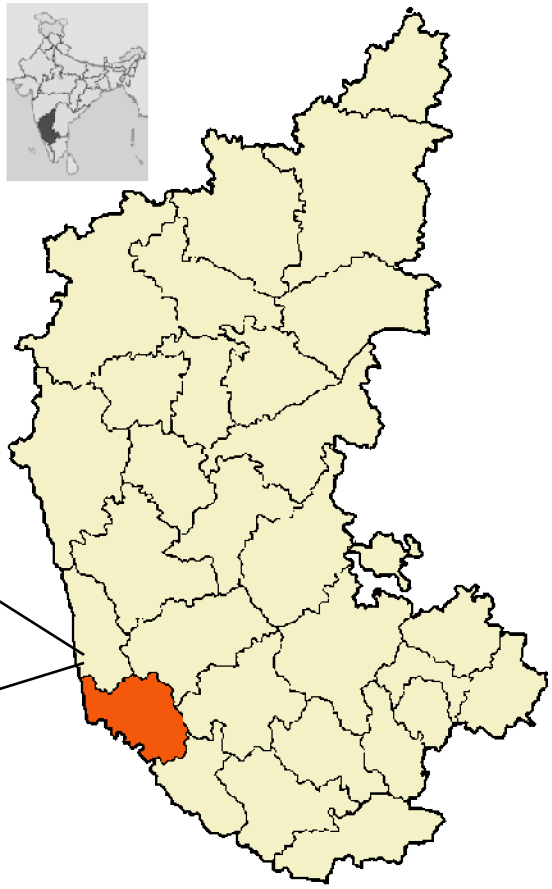
SAMPLING:

The sampling was done during July, August, September 2016 using a quadrate of 5 square meters in mangroves and 10 square meters in NITK beach. In both the sites the temperature was recorded and the species were identified (chhapgar, 1957).

FIGURE 1: STUDY AREA

CHITHRAPU

NITK BEACH



CHITHRAPU

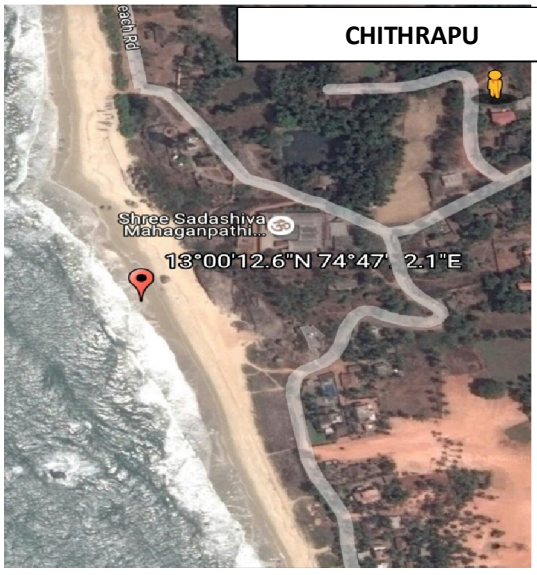


TABLE 1: CRAB SPECIES RECORDED IN CHITHRAPU

SL.NO	SCIENTIFIC NAME	FAMILYNAME	COMMON NAME	HABITAT
1	*Scylla serrata*	Portunidae	Mud crab (E) Eeade(K), Dengi(Tu)	muddy banks of channels
2	*Metopograpsus messor*	Grapsidae	Shore crab(E) Eeade(K) Dengi(Tu)	In between the roots of *A. marina, R. mucronata*
3	*Metopograpsus latiforons*	Grapsidae	Eeade(K) Dengi(Tu)	In between the roots of *A. marina, R .mucronata*
4	*Sesarma bidens*	Sesarmidae	Red claw crab(E) Eeade(K) Dengi(Tu)	In between the prop roots of *Rhizophora* Plants
5	*Sesarma qudratum*	Sesarmidae	Eeade(K) Dengi(Tu)	In between the prop roots of *Rhizophora* Plants
6	*Uca annulipes*	Ocypodidae	Ring legged fiddler crab(E) Eeade(K) Bappungi (Tu)	All along the intertidal zone
7	*Diogenes pugilator*	Diogenidae	Hermit crab(E)	Intertidal zone
8	*Grapsus strigosus*	Grapsidae	Eeade(K) Dengi(Tu)	Rocks, just above the limit of sea spry

TABLE 2: THE CRAB SPECIES RECORDEDIN NITK-BEACH

1	*Dotilla myctiroides*	Dotillidae	Soldier crab(E) Eeade(K), Dengi(Tu)	Banks of channels and creeks
2	*Grapsus albolineatus*	Portunidae	Eeade(K), Dengi(Tu)	Rocky shore
3	*Ozius tuberculosis*	Portunidae	Eeade(K), Dengi(Tu)	Rocky shore
4	*Portunus pelagicus*	Portunidae	blue swimmer crab(E) Eeade(K), Dengi(Tu)	sandy or sandy-mud bottoms
5	*Portunus sanguinolentus*	Portunidae	Red spotted swimming crab(E) Eeade(K), Dengi(Tu)	sandy banks of channels
6	*Charybdis cruciata*	Portunidae	Eeade(K) Dengi(Tu)	Rocky areas as well as sandy and muddy areas.

TABLE: 3

MONTH	CHITHRAPU -MANGROVE		NITK BEACH	
	Shannon	Evenness	Shannon	Evenness
JULY	1.496	0.7438	1.617	0.8397
AUGUST	1.441	0.6033	1.546	0.9386
SEPTEMBER	1.668	0.7574	1.627	0.8482

FIGURE 3: THE GIVEN FIGURE SHOWS MANGROVE CRABS FAMILY DISTRIBUTION

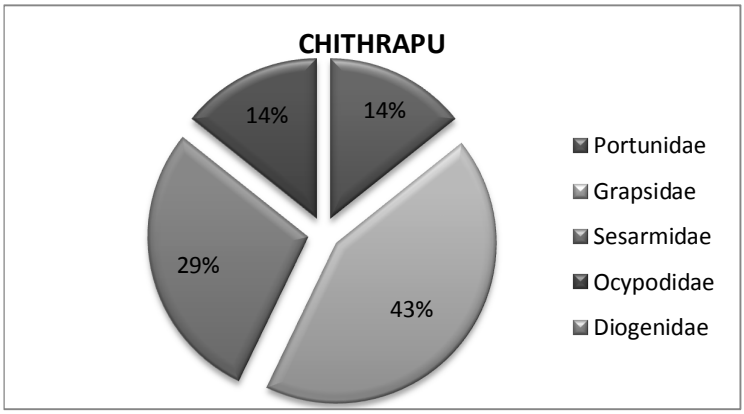


FIGURE 4: THE FIGURE SHOWS MARINE CRABS FAMILY DISTRIBUTION

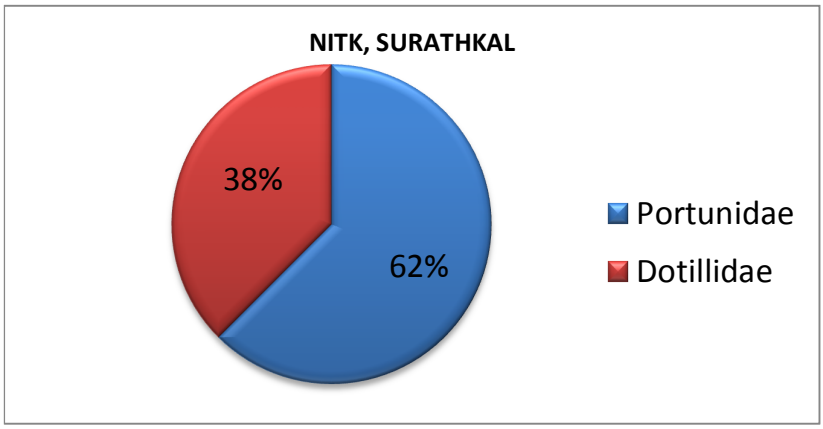


FIGURE 5: THE FIGURE SHOWS NUMBER OF INDIVIDUALS IN MANGROVE:

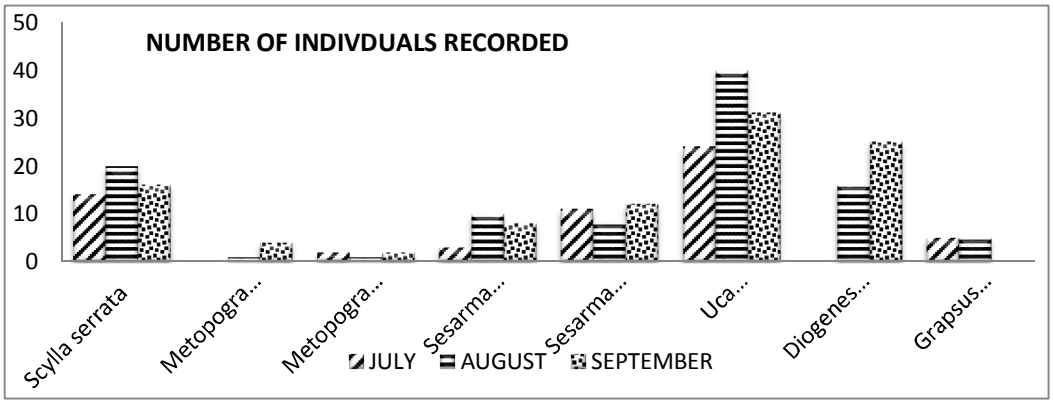


FIGURE 6: THE FIGURE SHOWS NUMBER OF INDIVIDUALS IN NITK BEACH:

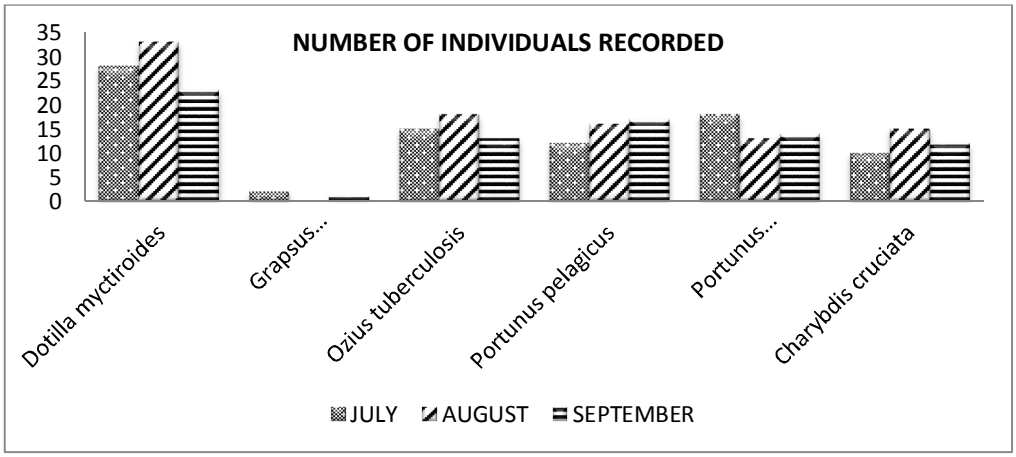


PLATE 1

RESULT AND DISCUSION:

A total of 226 individuals belonging to 8 species and 250 individuals belonging 6 species were recorded in mangrove and NITK beach respectively. *Uca annulipes* belonging to the family Ocypodidae was most dominant species in mangrove vegetation (95ind.) and play a vital role in recycling and decay of plant materials (Kwok *et al*.1995). *Dotilla myctiroides* belonging to the family Dotillidae was dominant in NITK beach (85ind.). A Total 12 species of decapods belonging to the families Portunidae (6 species), Grapsidae (3 species), Sesarmidae (2 species), Ocypodidae (1 species), Xanthidae (1 species) and Dotillidae (1 species) were recorded. Most common species at Chitrapu were *Scylla serrata, Metopograpsus messo, Uca annulipes, Sesarma bidens, Metopograpsus latiforons, Sesarma* qudratum and Diogenes *pugilator* (table 1) and at NITK beach were *Dotilla myctiroides, Grapsus albolineatus, Ozius tuberculosis, Portunus pelagicus* and *Portunus sanguinolentus* (table 2). The diversity study of crabs in Karwar by Prandnya *et al***.** (2011) recorded 13 species in mangrove environment. They reported that crabs belonging to families Grapsidae and Ocypodidae were most dominant. *Uca annulipes, Metopograpsus messor, Sesarma quadratum, Metopograpsus latiforons, Grapsus albolineatus* and *Scylla serrata* were common species found in Karwar and Chitrapu mangrove sites. Factors like substrate suitability, effect of tidal inundation and distribution of mangrove plants influenced the zonation and abundance of crabs (Prandnya *et al***.,** 2011). The same environmental conditions like rainfall, humidity and temperature in Karwar and Chitrapu may be the reason for the similar results in these two mangrove sites. NITK beach is represented by two families, 62% of Portunidae and 38% of Dotillidae (fig4). A total of 19 species belonging to 8 families and 15 genera were recorded by Trivedy *et al.,* 2012 in Gulf of Cutch, Gujarath. Out of this 10 species belonging to 8 families and 10 genera were reported from mangrove mud flat habitat and 11 species belonging to 6 families and 10 genera were reported from open mud flat. They also reported that the maximum species were recorded in open mud flat compared to mangrove mud flat. Our study on habitat preference showed the opposite result.

Monthly variation in the species diversity (Shannon-Wiener diversity index, H^1 $\log_e$) and Evenness, J^1 are given in table 3. During the study period maximum species diversity was observed in September 2016 (1.668), when 106 individuals belonging to 8 species were recorded in mangrove vegetation. This is followed by July 2016 (1.496), when 59 individuals belonging to 6 species were recorded. In NITK beach maximum species diversity was observed during September 2016 (1.627), with 80 individuals belonging to 6 species were recorded followed by July 2016 (1.617) with 85 individual belonging to 6 species. The maximum evenness (0.7574) was recorded in September 2016 at Chithrapu and minimum was in August 2016 (0.6033). In NITK beach maximum evenness was in the month of August 2016 (0.9386). Species diversity and even distribution of organisms was noticed during post monsoon season in both the sites which may be due to breading activity in monsoon seasons i.e. July, August. A good number of crabs were seen during this monsoon and post monsoon seasons this may be due to environmental effects or low salinity (Prandnya *et al***.,** 2011). The decline in crab population may affect the food chain and also the soil and water enrichment. The discharges from the different kinds of industries growing in the proposed smart city of Mangaluru may be a threat to the diversity of crabs in the area and therefore the conservation of crabs is very important.

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