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**PRELIMINARY SURVEY OF HERPETOFAUNA OF BORIVALI
MANGROVES – A COASTAL BELT IN THE SUBURBS OF MUMBAI**

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ABSTRACT:

Mangroves are the tropical and subtropical coastal forest formations encircled/spread by the tidal rivers and/or the sea water flooded frequently by the tidal water. Growing in the intertidal area and estuary mouths between land and sea, Mangroves provide critical habitat for a diverse marine and terrestrial flora and fauna. Healthy mangrove forests are key to healthy marine ecology. A preliminary survey of the herpetofauna of Borivali Mangroves was undertaken from March 2008 - July 2010. The Survey revealed dominance of amphibian fauna during monsoon, however reptilian fauna dominated the other seasons of the year. Amphibians were represented by three families with five genera and only one order Anura. The reptilian fauna comprised of eleven families belonging to three orders and twenty one genera. Order Ophidia showed significant dominance of eight non-venomous species of snakes, three semi-venomous and five venomous species of snakes. Testudines were represented by Trionyx while Saurians were represented by Gekkonidae, Agamidae, Varanidae and Scincidae.

KEY WORD: Mangroves, Reptiles, Amphibians.

INTRODUCTION:

Mangroves are woody trees or shrubs that grow in the coastal habitats, for which the term mangrove swamp is also used. The word mangroves as obscurely connected with Portuguese word “mangue” and the Spanish word “mangle” and the English word “groves” as it dates its origin in 1613. India has a mangrove area of about 3,56,500 Ha. Comprising more than 60 species belonging to 41 genera and 29 families (Untawale and Wafar, 1986). Of these 80% of the Indian mangroves are present along the East Coast and Andaman and Nicobar Group of islands (Snedakar and Snedakar, 1984). The rest is present along the West Coast of India and a small percentage on the Lakshadweep group of islands. In Maharashtra, Mumbai and Thane have the most dense mangroves in the state, hosting over 40 Sq. Km. of the Coastal ecosystem. A study of Maharashtra

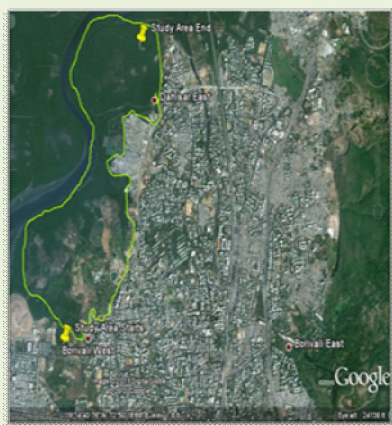
Remote Sensing Application Center based on analysis of satellite imagery (done at the behest of the Bombay high court) found that the state has approximately 257.71 sq. km. of mangroves. Urbanized areas of Mumbai and Thane have the largest swathe of coastal woodlands forming the dense tidal forests, mainly because of largest areas of mud flats.

Mangroves are one of the biologically diverse ecosystems in the world. Being rich in organic matter and nutrients, it supports a unique diversity of flora and fauna. India has rich diversity of herpetofauna, represented by 510 species of reptiles and 235 species of amphibians. Literature survey reveals that a few naturalists and scientists have attempted to study Herpetofauna as early as 1870s. Stoliczka (1872), Daniel and Shull (1963) and Vyas (2000) have studied reptiles and amphibians from Gujarat. The Western districts of Kolhapur, Sindhudurga, Satara, Ratnagiri, Pune, Raigad, Nasik and Thane are rich in biodiversity as they harbour parts of the Western Ghats, one of the hotspots of biodiversity. According to Padye and Ghate (2002) out of 10 families of Amphibian from India 6 (i.e.60%) are represented in the state of Maharashtra. Review of literature revealed deficit in the information regarding herpetofauna of Mangrove Forests along the Borivali region of the Mumbai. The diverse Habitat of the mangrove swamps are rapidly depleting due to rapid Industrialization, urbanization and land reclamation. Hence the study was undertaken to fulfill this lacuna of information in the field of biodiversity, a frequently devastating ecosystem.

STUDY AREA:

The study area, Gorai (Borivali) (19° 14'12.69" N & 72° 49' 12.51" E) is about 3 mts. above sea level (Fig. 1). This creek transects the northwest portion of the suburban Mumbai,

extends 12 km inland through vast mangrove mudflats and low lying marshy areas.



showing study area.

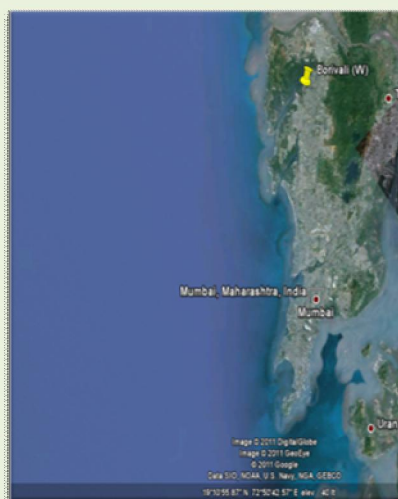


Fig.1: Google Map of Borivali Mangroves

South of the creek is a village, Gorai & Charkop. The northern bank of the creek is bordered by Gorai village, which is relatively less developed and forms a natural beach and a major tourist attraction Esselworld. The shallow creek of Gorai is under the high influence of semidiurnal tides with spring and neap ranges of 3.5 mts. and 1.8 mts. respectively in the mouth area that induces good tidal flushing of the lower reaches. The vegetation under daily tidal influence comprises of *Avicennia marina* being the dominant, *Rhizophora mucronata*, *Salvadora persica*, *Acanthus ilicifolius*, *Sesuvium portulacastrum*, *Derris uliganosa*, *Clerodendron inerme*, *Aeluropus lagopoides* (grass), *Typha angustata* (cattail) were other mangrove associated plant species present in the study area. The average height of mangroves falls between 2 - 6 mts.

METHODOLOGY:

The preliminary survey of herpetofauna of Gorai Creek (Borivali) was carried out from March 2008 - July 2010. The random surveys using Visual encounter survey method was employed. Randomized walk transects were carried out during the low tide periods across the terrestrial and marshy habitats consisting of reclaimed lands, bunds, mangrove forests, water paths & grassy patch on monthly basis to document the herpetofauna. Fishing Nets with the help of local fishermen were towed around the water canals to catch the sea snakes and other species of snakes. However were successful in catching *Acrochordus granulatus* (*File snake or wart snake*). An attempt was made to bring out the richness of amphibians and reptiles in the mangroves of Gorai creek, authenticated by comparing data collected on field with the standard herpetology references from books and other sources (Das and Dutta, 1998; Daniel, 2002; Ashok Captain 2004; REPTILES DATABASE website). Herpetofauna was observed & identified on the basis of scale count (in case of snakes) and specific marking patterns on the body. No animal was collected during the survey.

RESULTS AND DISCUSSION:

The checklist presented has a scope to be updated; giving the difficulty of the terrain and marshy habitat some species may not have been observed. A further study is required especially for the survey of amphibians seen in the mangroves of Mumbai. The survey of herpetofauna in coastal mangroves of Borivali revealed dominance of amphibian fauna during monsoon from June to September, perhaps due to the influx of rainwater and river water, which decreases the salinity of the estuarine/creek waters considerably (Table 1). Reptilian fauna showed the highest diversity throughout the study period (Fig.2). Amphibians

were dominated by frogs and toads representing three families Viz. Bufonidae, Ranidae and Rhacophoridae with five genera. Most of the frogs were observed in amplexus during monsoon. The reptilian fauna observed were Ophids (serpent), Saurian (lizards), and Testudines was represented by only one species Viz. *Lissemys punctata* (Trionyx); while Order Sauria showed dominance of five species resembling four families viz. Gekkonidae, Agamidae, Varanidae and Scincidae. Order Serpentes showed diversity of eight species of non-venomous, three species of semi-venomous and five species of venomous snakes. Colubroids dominated among the ophids with eight species representing five non-venomous and three semi-venomous snakes. This checklist will assist the researchers working in the field of herpetofauna of the Mangrove areas. This specific regional checklist might be replicated as presence and absence data of herpetofauna of many other areas of the Mangroves is lacking.

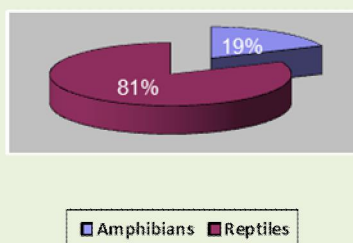


Fig.2: Dominance of Reptilian fauna in Mangroves from Borivali.

CONCLUSION:

Biologist estimated that the current rate of extinction is at least 1000 to 10,000 times the rate before we arrived. In due course of time all species will become extinct, but there is considerable evidence that we are hastening the final exit for a growing number of species. According to the researchers Edward O. Wilson and Stuart Primm, at a 1% extinction rate atleast 20% of the world's current species of animal and plant could be gone by 2030 and 50% could vanish by the end of this century. In spite of this, many are living precariously due to onslaught of deforestation, urbanization, pollution and concomitant habitat destruction for land reclamation. Thus the Government agencies should now take stringent action on the landgrabbers who have encroached upon the mangrove areas clandestinely. Many mangrove areas from Versova to Bhayandar have been mercilessly hacked and concrete buildings have come up on reclaimed land. This will have detrimental effects on rich herpetofauna now sighted at Gorai mangroves (Borivali). Nevertheless the constant unloading of the solid garbage waste of the North Mumbai is at Gorai will fasten the destruction of rich Herpetofauna sighted in the present investigation making it a relic of past if not conserved.

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Reality e-Guide

Table 1: Diversity of Herpetofauna of Borivali (Gorai) Mangroves

| (A) Reptiles Seen in Mangroves of Borivali | | | | | |
|---|------------------------|-----------------------------------|--|----------------------|----|
| Sub-Order | Family | Species | English Name | V/SV/ NV | |
| (Order) Testudines | Trionyx | <i>Lissemys punctata</i> | Indian Mud or Flap-Shell Turtle | - | |
| Sauria (Lacertilia) | Gekkonidae | <i>Hemidactylus brookii</i> | Brook's Gecko | - | |
| | | <i>Hemidactylus leschenaultia</i> | Bark Gecko | | |
| | Agamidae (Agamas) | <i>Calotes versicolor</i> | Garden Lizard | - | |
| | Varanidae | <i>Varanus bengalensis</i> | Bengal Monitor | - | |
| | Scincidae | <i>Mabuya carinata</i> | Brahminy Skink | - | |
| Serpentes (Ophidia) | Typhlopidae | Ramphotyphlops braminus | Flowerpot Snake or Brahminy blindsnake | NV | |
| | Boidae (Pythonidae) | <i>Python molurus molurus</i> | Indian Python | NV | |
| | Acrochordidae | <i>Acrochordus granulatus</i> | Wart Snake or File Snake | NV | |
| | Colubroid | | <i>Ptyas mucosa</i> | Indian Rat Snake | NV |
| | | | <i>Argyrogena fasciolatus</i> | Banded Racer | NV |
| | | | <i>Xenochrophis piscator</i> | Checkered Keelback | NV |
| | | | <i>Amphiesma stolatum</i> | Buffstriped Keelback | NV |
| | | <i>Macropisthodon plumbicolor</i> | Green Keelback | NV | |

| | | | | |
|--|-----------|-------------------------------|------------------------------------|----|
| | | <i>Gerarda prevostiana</i> | Glossy Marsh Snake | SV |
| | | <i>Ahaetulla nasutus</i> | Common Tree Snake or Vine Snake | SV |
| | | <i>Cerberus rynchops</i> | Dogfaced Water Snake | SV |
| | Elapidae | <i>Bungarus caeruleus</i> | Common Indian Krait | V |
| | | <i>Naja naja</i> | Spectacled Cobra | V |
| | Viperidae | <i>Daboia russellii</i> | Russell's Viper | V |
| | | <i>Echis carinatus</i> | Saw-Scaled Viper | V |
| | | <i>Trimeresurus gramineus</i> | Bamboo Pit Viper | V |

V= Venomous, NV= Non-Venomous, SV= Semi-Venomous

(B) Amphibians Seen in Mangroves of Borivali

| Order | Family | Species | English Name | |
|--------------|---------------|-----------------------------------|---------------------|---|
| Anura | Bufonidae | <i>Duttaphrynus melanostictus</i> | Common Indian Toad | - |
| | Ranidae | <i>Euphlyctis cyanophlyctis</i> | Skittering Frog | - |
| | | <i>Hoplobatrachus tigerinus</i> | Indian Bull Frog | - |
| | | <i>Fejervarya limnocharis</i> | Indian Cricket Frog | - |
| | Rhacophoridae | <i>Polypedates maculatus</i> | Common Tree Frog | - |