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Studies on tidal vegetation in East Midnapore Coastal Belt, West Bengal, India

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ABSTRACT

This research paper presents the analytical studies on tidal vegetation of Purba Medinipur district. This district is covered by a massive network of canals and Rivers including Hoogli, Rupnarayan, Haldi, Keleghi, Bagui & Rasulpur. Tidal zones of canals and estuaries of Rupnarayan, Haldi, Hoogli & Rusulpur are natural place of mangroves and mangrove associates. Total 42 species have been identified and out of theme 6 species i.e. Avicennia marina, Avicennia officinalis, Bruguiera gymnorrhiza, Ceriops decandra, Rhizophora mucronata & Sonneratia alba are mangrove plants and other 36 plant are mangrove associates. Mangroves are colonized at sea side estuaries whereas mangrove associates are found both sea side area and canal side.

Keywords: *Mangroves, Mangrove associates, Estuaries, Species and Tidal vegetation*

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1. INTRODUCTION

Purba Medinipur is one of the 23 administrative districts of West Bengal and it is coved by reticulate river and canal system. It is situated by the Bay of Bengal and is surrounded by the Bay of Bengal and Balasore district of Odisha State in its South, Paschim Medinipur in its West, Howrah district in the North and South 24 Parganas in the East. Coastal line of Midnapore occupies 27% of total coast line in West Bengal (near about 60KM) covering Digha, Sankarpur, Tajpur, Mandarmoni, Junput, Hijli, Khejuri and Haldia (Mandal *et al*.,2013). Tidal zone of estuaries of rivers and canals bears distinct vegetation mainly mangroves and mangrove associates. Mangroves are defined as assemblages of salt tolerant trees and shrubs that grow in the intertidal regions of the tropical and subtropical coastlines. They grow luxuriantly in the places where freshwater mixes with seawater and where sediment is composed of accumulated deposits of mud. **M**angroves are a threatened salt tolerant higher group of flowering plants (Naskar and Mandal, 1999) that occur in relatively sheltered areas along estuaries, coastal lagoons and backwaters. They are generally inundated and exposed during regular high and low tides respectively, and are nurtured by a mixture of fresh water from rains and land drainage with coastal marine waters (Banerjee *et al*., 2002). Typical mangrove species usually have pneumatophores or breathing roots (negative geotropic root), stilt roots, knee roots, viviparous germination, xerophyllous leaves and salt excretory glands (Tomlinson, 1986).

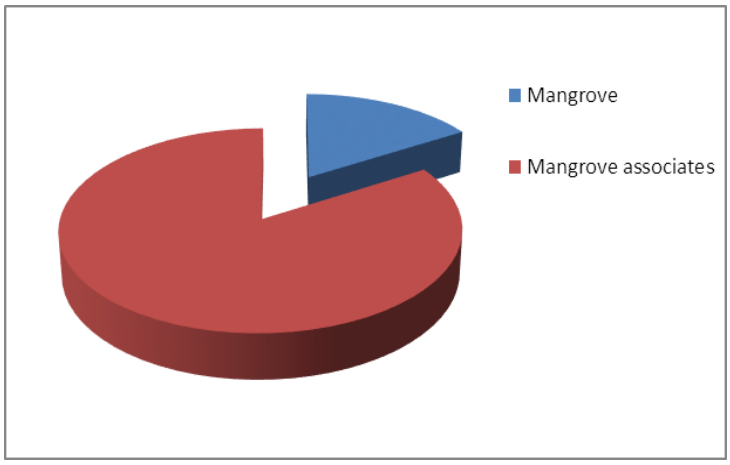
2. METHODS AND MATERIALS

This was totally field based research work. Field survey and field study are two methods which are applied to construct this article. Frequent field study all over coastal area, canals and rivers sides were continued in every month from the year 2014 and onwards. Direct observation of vegetation was done for identification and better understanding of the special peculiarities of complex coastal vegetation of Midnapore. Under the supervision of my Ph.D. guide all procedure has been conducted. This research work is totally self financed, self interested and dedicated programme for enhancement my career. Nicon Cool Pix L120 camera and Germen eTrex GPS detecting instrument were handled for proper data collection. Notable specimens were collected making herbarium specimen for further reference.

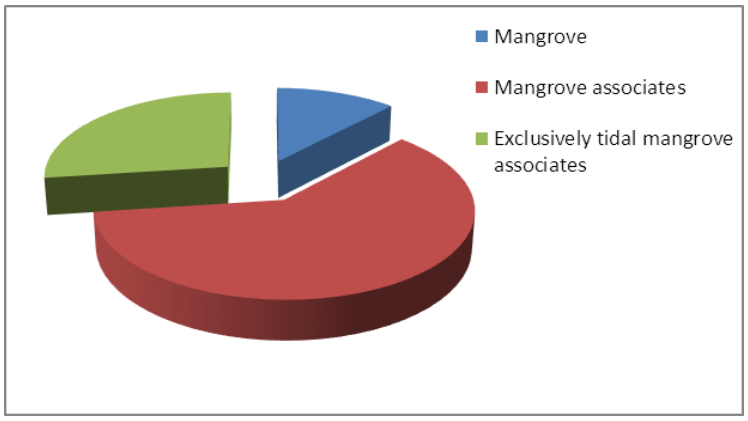
3. RESULT AND DISCUSSION

After completion of my target field study 42 tidal plant species have been identified in which 6 species are mangroves and rest of 36 species are mangrove associates this proportion is presented in pie-chart no-1. Six listed mangrove species are found only in tidal zone. Out of 36 mangrove associates 17 species are exclusively tidal mangrove associates and grown in mud of tidal flat and other are distributed terrestrial habitat which is flooded at high tide. All 42 plant species, their families, habitat and characters are listed in table No-1. In table No-2 only mangrove plant species, their families and characters are listed. Table No-3 bears exclusively tidal mangrove associates with their families and characters. Pie-chart No-2 indicates the proportion of mangrove and exclusively tidal mangrove associates.

Mangrove species are grown only moderate salt containing marshy tidal area especially cannel side and estuary points. High salt containing sandy coastal side is not suitable for mangrove species habitat. So, in study area except estuary point, cannel side and tidal flat mangrove species does not show their existence. Tidal flow, moderate salt containing muddy soil is suitable for mangrove species occurrence.



Pie-chart No.-1: Proportion of mangrove sp. and mangrove associates sp.



Pie-chart No.-2: Proportion of mangrove sp., mangrove associates sp. and exclusively tidal mangrove associates sp.

Table 1: All 42 tidal plant species

S.N.	NAME OF PLANT	FAMILY	HABITAT & CHARACTERS
1	*Acacia nilotica* (L.) Willd.Ex Del.Ssp. *indica* (Benth.) Brenan	Mimosaceae	Mainly terrestrial. Sometimes it grows in tidal areas.
2	*Acanthus ilicifolius* L.	Acanthaceae	Aquatic, mainly found both sides of every canal.
3	*Albizia lebbeck* (L.) Benth.	Fabaceae	It can grow low tidal areas.
4	*Arundo donax* L.	Poaceae	Aquatic monocot. It can grow in fresh water and saline water.
5	*Avicennia marina* (Forssk) Vierh.	Acanthaceae	Mangrove plant. It grows in tidal mud.
6	*Avicennia officinalis* L.	Acanthaceae	Mangrove plant. It grows in tidal mud.
7	*Bacopa monnieri* (L.) Pennell	Scrophulariaceae	It grows in muddy low tidal area.
8	*Bruguiera gymnorrhiza* (L.) Lam.	Rhizophoraceae	It grows in high tidal area.
9	*Caesalpinia bonduc* (L.) Roxb.	Caesalpiniaceae	It can grow low tidal areas.
10	*Calotropis gigantea* (L.) W.T. Aiton	Apocynaceae	It can grow at canal sides.
11	*Ceriops decandra* (Griff.) Ding Hou	Rhizophoraceae	It grows in high tidal area.
12	*Clerodendrum inerme* Gaertn.	Lamiaceae	It grows at canal sides.
13	*Cocos nucifera* L.	Arecaceae	It can grow at low tidal areas.
14	*Crotalaria pallida* Aiton	Fabaceae	It can grow at low tidal areas.

15	*Cynodon dactylon* (L.) Pers.	Poaceae	It is aquatic & terrestrial. It is also good soil binder.
16	*Desmostachya bipinnata* (L) Stapf.	Poaceae	It grows low tide canal &river side.
17	*Derris scandens* Roxb.(Benth.)	Fabaceae	It is climbing plant.
18	*Distichlis distichophylla* (Labill.) Fassett	Poaceae	It can grow high tide and low tide areas.

S.N.	NAME OF PLANT	FAMILY	HABITAT & CHARACTERS
19	*Dolichandrone spathacea* (L.f.) K.Schum.	Bignoniaceae	It is found in the bank of all canals and coastal side.
20	*Excoecaria agallocha* L.	Euphorbiaceae	It is common in coastal side & canal side of East Midnapore.
21	*Fimbristylis ferruginea* (L.) Vahl	Cyperaceae	It grows low tidal muddy areas.
22	*Halosarcia indica* (Willd.) Paul G. wilson	Amaranthaceae	On muddy bank of canal and bay sea.
23	*Hibiscus tiliaceus* L.	Malvaceae	Mangrove associate tree.
24	*Ipomoea carnea* Jace.	Convolvulaceae	Aquatic shrub and weed.
25	*Lantana camara* L.	Verbenaceae	Found through coastal area of East Midnapore.
26	*Millettia pinnata* (L.) Panigrahi	Fabaceae	Coastal vegetation. Also it is found besides of canals.
27	*Myriostachya wightiana* (Nees ex Steud.) Hook.f.	Poaceae	It grows in the bank of canals.
28	*Pandanus odoratissimus* Linn.f.	Pandanaceae	It grows in low tidal areas. It is mangrove associate.
29	*Phoenix sylvestris* (L.) Roxb.	Arecaceae	It grows in low tidal areas. It is mangrove associate.
30	*Porteresia coarctata* (Roxb.)	Poaceae	Grow muddy saline soil.
31	*Prosopis juliflora* (Sw.) DC.	Fabaceae	It can grow low and high tidal areas.
32	*Rhizophora mucornata* Lam.	Rhizophoraceae	Mangrove plant.

S.N.	NAME OF PLANT	FAMILY	HABITAT & CHARACTERS
33	*Saccharum spontaneum* L.	Poaceae	It grows in the bank of rivers and canal.
34	*Salicornia brachiata* Roxb	Chinopodiaceae	It can grow muddy saline beach.
35	*Sesuvium portulacastrum* (L.) L	Azioaceae	It grows in muddy sea beach.
36	*Sonneratia alba* Sm.	Lythraceae	It grows tidal muddy areas.
37	*Suaeda monoica* Forssk.ex.J.F. Gmel	Amaranthaceae	Grow on muddy beach.
38	*Suaeda nudiflora* (Willd) Moq.	Amaranthaceae	Grow on muddy beach.
39	*Thespesia populnea* (L.) Sol. ex Correa	Malvaceae	Mangrove associate tree.
40	*Tylophora indica* R. Br.	Apocynaceae	It is a climbing plant.
41	*Typha angustifolia* L.	Typhaceae	It grows in the bank of canals.
42	*Xyris pauciflora Willd.*	Xyridaceae	Grow in low tidal muddy area.

Table 2: Mangrove plant species

S.N.	NAME OF PLANT	FAMILY	HABITAT & CHARACTERS
01	*Avicennia marina* (Forssk) Vierh.	Acanthaceae	Mangrove plant. It grows in tidal mud.
02	*Avicennia officinalis* L.	Acanthaceae	Mangrove plant. It grows in tidal mud.
03	*Bruguiera gymnorrhiza* (L.) Lam.	Rhizophoraceae	It grows in high tidal area.
04	*Ceriops decandra* (Griff.) Ding Hou	Rhizophoraceae	It grows in high tidal area.
05	*Rhizophora mucornata* Lam.	Rhizophoraceae	Mangrove plant.
06	*Sonneratia alba* Sm.	Lythraceae	It grows tidal muddy areas.

Table 3: Exclusively tidal mangrove associates

S.N.	NAME OF PLANT	FAMILY	HABITAT & CHARACTERS
01	*Acanthus ilicifolius* L.	Acanthaceae	Aquatic, mainly found both sides of every canal.

02	*Arundo donax* L.	Poaceae	Aquatic monocot. It can grow in fresh water and saline water.
03	*Bacopa monnieri* (L.) Pennell	Scrophulariaceae	It grows in muddy low tidal area.
04	*Cynodon dactylon* (L.) Pers.	Poaceae	It is aquatic & terrestrial. It is also good soil binder.
05	*Desmostachya bipinnata* (L) Stapf.	Poaceae	It grows low tide canal &river side.
06	*Distichlis distichophylla* (Labill.) Fassett	Poaceae	It can grow high tide and low tide areas.
07	*Dolichandrone spathacea* (L.f.) K.Schum.	Bignoniaceae	It is found in the bank of all canals and coastal side.
08	*Excoecaria agallocha* L.	Euphorbiaceae	It is common in coastal side & canal side of East Midnapore.
09	*Fimbristylis ferruginea* (L.) Vahl	Cyperaceae	It grows low tidal muddy areas.
10	*Halosarcia indica* (Willd.) Paul G. wilson	Amaranthaceae	On muddy bank of canal and bay sea.
11	*Ipomoea carnea* Jace.	Convolvulaceae	Aquatic shrub and weed.
12	*Myriostachya wightiana* (Nees ex Steud.) Hook.f.	Poaceae	It grows in the bank of canals.
13	*Porteresia coarctata* (Roxb.)	Poaceae	Grow muddy saline soil.
14	*Sesuvium portulacastrum* (L.) L	Azioaceae	It grows in muddy sea beach.
15	*Suaeda nudiflora* (Willd) Moq.	Amaranthaceae	Grow on muddy beach.
16	*Suaeda monoica* Forssk.ex.J.F. Gmel	Amaranthaceae	Grow on muddy beach.
17	*Salicornia brachiata* Roxb	Chinopodiaceae	It can grow muddy saline beach.

Legends

A. Fruit of *Excoecaria agallocha*, **B.** Stilt root & Pneumatophores, **C.** Fruit of *Sonneratia alba,* **D.** *Distichis distichophylla,* **E.** *Porteresia coarctata,* **F.** Pneumatophores, **G.** *Avicennia officinalis,* **H.** *Heritiera fomes*, **I.** *Clerodendrum inerme*, **J.** *Sonneratia alba,* **K**. *Acanthus ilicifolius,* **L.** Crypto Viviparous germination *of Avicennia officinalis*. *portulacastrum,* 17. *Suaeda nudiflora, 18.* Inflorescence *of Caesalpinia bonduc & 19. Inflorescence Derris scandens.*

4. CONCLUSION

Mangroves and mangroves associates are the tidal vegetation. Further research is needed on the medicinal value, ecological value, socio-economic value and conservation of many threatened plant species of coastal area of studied district. Various anthropogenic activities i.e. hotel industry, tourism, dry fish industry, fishing activities, grazing etc. are the main causes to destroy the tidal vegetation. East Midnapore tidal vegetation is a golden treasury of natural flora. Also adaptation variation among these plant species may be subject of next research.

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