

Present status of plant diversity in Saint Martin's Island of Bangladesh

Mohammed Mukhlesur Rahman

Bangladesh Forest Research Institute, P. O. Box, 273, Chittagong-4000, Bangladesh

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ABSTRACT: The study was conducted to determine the plant diversity in St. Martin's Island. A total of 78 species belonging to 40 families were identified during the experimental period. The highest number of species were recorded under Fabaceae, followed by Convolvulaceae, Poaceae, Verbenaceae, Anacardiaceae and other groups which contained less than 4 species. The present study focused that trees, herbs and shrubs were contained 63, 31 and 6% respectively. Only 13 species were recorded as cultivated plants in the whole study area. The results revealed that each family contained less species numbers than plain land areas and plant diversity is degraded by anthropogenic pressure on St. Martin's Island. More sustainable and adapted species should be selected for plantation programs in such saline environments, which help to increase sustainable biodiversity in St. Martin's Island. The present results will be helpful for the conservation of biodiversity with the increasing of awareness of the local people.

Keywords: Coral Island, narical Jingira, diversity, mangrove, conservation

I. INTRODUCTION

St. Martin's Island is located in the northeast part of the Bay Bengal, about 9 km far from Cox's Bazar-Teknaf peninsula and the southernmost part of Bangladesh (Afrinet al., 2013). St. Martin's is only 8 km² dumb-bell shaped sedimentary Island and it is about 8 km the west of the northwest coast of Myanmar at the mouth of the Naf River. The area of the island is about 5.9 km² whereas with the rocky platforms extending into the sea the total area of the island is about 12 km². It was connected to the mainland of the Teknaf peninsula as-recently-as 6,000-7,000 years ago (Warrick et al., 1993; Chowdhury, 2012). Currently, there are about 6,000 people amidst approximately 3,700 inhabitants living primarily

from fishing while the other staple livelihood sources are tourism, agriculture, and day labour (Thompson and Islam, 2010). The centre and the south are mainly farmland and temporal huts, most of the permanent structures are around the far north of the island (Islam et al., 2005; Kabir, 2006). Contemporarily, the number of tourists has dramatically increased which is causing the deterioration of the natural ecosystem of the island through many efforts have already been taken to preserve the several endangered species of turtles and corals etc. (Haque, 2009; Hasan, 2000; Hossain, 2013). There is quite diverse vegetation because the remaining native species have been supplemented by a considerable number of cultivated and introduced species. The recent floral surveys recorded 260 plant species, including 150 herbs, 32 climbers, 25 shrubs and 53 trees, belonging to 58 families (DoZ, 1997). But the island is under heavy pressure for tourism where the development of infrastructure is unplanned and unregulated. A noticeable percentage of biodiversity has already been lost from the island (MoEF, 2001). There is a great possibility of implementation of plantation programs in the fallow land of St. Martin's Island. Therefore, an attempt was taken to determine the present status of plant diversity which will help to improve the biodiversity conservation and environmental conditions of St. Martin's island.

II. MATERIALS AND METHODS

The whole of St. Martin's Island was selected as a study area which lies between 20°34' to 20°39' N latitudes and 92°18' to 92°21' E longitudes (Fig. 1). The study area is known as a union under Teknaf Upzila in Cox's Bazar district of Bangladesh. The total land area is elongated and divided in the north-south.



Fig.1. Location of the study area

Uttar Para is the northern part of the island with a maximum length, along the north-south axis, of 2,134 m, and a maximum width of 1,402 m. Golachipa is a narrow connected road between Uttar Para and Madhya Para. Madhya Para, directly south of Golachipa is 1,524 m long and 518 m wide. Dakshin Para is 1,929 m long, with an additional narrow tail of 1,890 m towards the southeast and at 975 m wide. The island is almost flat with an average height of 2.5 m above mean sea level (Warrick et al., 1993; Ahmed, 1995). All soils contain some salts and sea water is the principal source of the salts. The range of pH value of soil is 6.8 to 8.2 and a huge amount of CaCO₃ is present in the soil. The highest amount of CaCO₃ is found in the lagoon and its range between 2.2 and 9.40 %. The climate is tropical in nature. The climate is pleasant and balanced. Winter begins in the middle of November and lasts until the end of February. The summer comes from March and continues up to the end of May. The rainy season starts in June and continues up to October. About 85% of rainfall occurs during this season. The main rainfall starts in the middle of June and continues up to the middle of July and an average 3000mm rainfall occurs during this time. From October to February the weather is mild with low rainfall. The minimum and maximum mean temperature vary from 15.80° to 26.20° C in December and May respectively (Cox's Bazar Weather Station, 2019). The humidity in the whole area is high throughout the year. In June, the highest humidity is 91%, while the minimum humidity is 70% in February. (Chowdhury, 2000; Tomascik, 1997;

Rahman, 2009). The study was conducted on the basis of the field data collection, observation and laboratory analysis during the period of (2019-2020) one year. Data were collected in four seasons, like winter (December- February), early monsoon (March –May), monsoon (June- August) and late monsoon (September- November). Random quadrat method was followed for sampling the phytodiversity and in this respect, 10 m×10m sized quadrates were applied. Statistical analyses were done in different stages for the determination of trees, herbs and shrubs.

III. RESULTS AND DISCUSSION

The attractive St. Martin's Island is grabbed saline water. The main part of the land has consisted of sandy soils. All plants were included of angiosperms flora and the total plants were classified in the five groups on the basis of the ecological habitats. The mangrove forests were found in the south part of the Island and Cheradia Island. There were two lagoons and Cheradia Island was fully flooded in the tidal period and high saline water grabs the total area. Some mangrove plant species were naturally originated and the maximum plants were dwarf and their densities were also so much less. The total number and the height of mangrove plant species were less than the main Sundarbans of Bangladesh and these types of species were available in two lagoons and Cheradia Island. The following types of plants species were found in this mangrove habitat (Table 1).

Table 1. Recorded mangrove plants species in St. Martin's Island

Sl.No.	Bengal name	Scientific name	Family	Nature of plants
1	Horgoza	<i>Acanthus ilicifolius</i> L.	Acanthaceae	S
2	Nunia	<i>Aegialitis rotundifolia</i> Roxb.	Combretaceae	T
3	Kholsi	<i>Aegiceras corniculatum</i> L.	Myrsinaceae	T

4	Bina	<i>Avecinia officinalis</i> L.	Verbenaceae	T
5	Gewa	<i>Excoecarica agallocha</i> L.	Euphorbiaceae	T
6	Kripa	<i>Lumnitzera racemosa</i> Willd.	Combretaceae	T
7	Golpata	<i>Nypafruticans</i> Wermb.	Arecaceae	Palm
8	Karonja	<i>Pongamia pinnata</i> (L.) Pierre	Fabaceae	T
9	Keora	<i>Sonneratia apetala</i> Buch.-Ham.	Sonneratiaceae	T
10	Bonjau	<i>Tamarix gallica</i> L.	Tamaricaceae	T
11	Bhola	<i>Turpiniapomifera</i> (Roxb.) DC.	Staphyleaceae	T

The study was conducted on the angiosperms plant species except algae, although many kinds of micro and macroscopic marine algae were available in this area.

The total Island is famous for sand dune environment and *Pandanus furcatus* species was the most dominated in the surrounding of the Island and *Golachipa* region. The *Ipomoea* pres-

caprae was found in sand dune of the shoreline of St. Martin's Island. *Casuarina equisetifolia* and *Vitex trifolia* were also found as dominant tree species in the sand dune area. This area was less fertile, due to environmental factors and plants diversity were less. A total of 7 species were recorded as sand dune species in St Martin's Island (Table 2).

Table 2. Sand dune vegetation in St. Martin's

Sl.No.	Bengal name	Scientific name	Family	Nature of plants
1	Jau	<i>Casuarina equisetifolia</i> L.	Casuarinaceae	Tree
2	Kolmishak	<i>Ipomoea alba</i> L.	Convolvulaceae	Herb
3	Kolmilata	<i>Ipomoea fistulosa</i> Mart.	Convolvulaceae	Herb
4	Chagolkori	<i>Ipomoea pres-caprae</i> (L.) R.Br.	Convolvulaceae	Herb
5	Kewakanta	<i>Pandanus foetidus</i> Roxb.	Pandanaceae	Shrub
6	Keya	<i>Pandanus furcatus</i> Roxb.	Pandanaceae	Shrub
7	Nilnishinda	<i>Vitex trifolia</i> L.	Verbenaceae	Tree

There were found some stones in the north and south para which were fully covered with moss and fern species. A huge amount of lower plants could easily grow on these stones and look like

green carpet. The blank places of stones layers were fulfill with sands and help to grow some fern species which were recorded in the following list (Table 3).

Table 3: Lithophytic plant species in St. Martin's

Sl. No.	Bengal name	Scientific name	Family	Nature of plants
1	Selaginella	<i>Selaginella repanda</i> Spring.	Selaginellaceae	H
2	Adiantum	<i>Adiantum incisum</i> Forssk.	Adiantaceae	H
3	Golalata fern	<i>Lygodium circinatum</i> (Burm. f.)	Schizaeaceae	H

There were found some plants in front of every home which help to cover the resident's area. Once upon a time, the islanders' residents lived under the open sky and they came here for catching fish only. The permanent people were less in the last two decades, but their numbers were increased day-by-day now. The maximum people were the

fishermen and they realized that St. Martin's Island is a natural calamity prone area and plantation is the most essential for saving their lives and assets. So, the islanders have planted some plants around in their homes. These plantations act as a belt during natural calamities. The following plants were found as homesteads species (Table 4).

Table 4. Homestead plants species in St. Martin`s Island

Sl.No.	Bengal name	Scientific name	Family	Nature of plants
1	Acacia	Acacia auriculiformis Cunn. Benth.	Fabaceae	T
2	Bel	Aegle marmelos (L.)	Rutaceae	T
3	Koroi	Albizia procera (Roxb.) Benth	Fabaceae	T
4	Supari	Areca catechu L.	Arecaceae	T
5	Kanthal	Artocarpus heterophyllus Lamk.	Moraceae	T
6	Belemboo	Averrhoa bilimbi L.	Oxalidaceae	T
7	Kamranga	Averrhoa carambola L.	Oxalidaceae	T
8	Neem	Azadirachta indica A. Juss.	Meliaceae	T
9	Borakbansh	Bambusa balcooa Roxb.	Poaceae	T
10	Mulibansh	Bambusa tulda Roxb.	Poaceae	T
11	Nayontara	CatharanthusroseusL. G. Don.	Apocynaceae	H
12	Narical	Cocos nucifera L.	Arecaceae	T
13	Chalta	Dillenia indica L.	Dilleniaceae	T
14	Mander	Erythrina fusca Lour.	Fabaceae	T
15	Gamar	Gmelina arborea Roxb.	Verbenaceae	T
16	Jarul	Lagerstroemia speciosa Roxb.	Lythraceae	T
17	Epilepil	Leucaenaleucocephala (Lam.) de&Wit.	Mimosaceae	T
18	Am	Mangifera indica L.	Anacardiaceae	T
19	Kadam	Neolamarckia cadamba L.	Rubiaceae	T
20	Orboroi	Phyllanthus acidus (L.) Skeels.	Euphorbiaceae	T
21	Payara	Psidium guava L.	Myrtaceae	T
22	Verenda	Ricinuscommunis L.	Euphorbiaceae	S
23	Raintree	Samanea saman (Jacq.) Merr.	Mimosaceae	T
24	Amra	Spondias pinnata (L.f.) Kurz.	Anacardiaceae	T
25	Mahogany	Swietenia mahogany King.	Meliaceae	T
26	Jam	Syzygium cumini (L.) Skeels	Myrtaceae	T
27	Tagar	Tabernaemontana divericata (L.) R. Br.	Apocynaceae	T
28	Segun	Tectona grandis L.	Verbenaceae	T
29	Katbadam	Terminalia catappa L.	Combretaceae	T
30	Tentul	Tamarindus indica L.	Fabaceae	T
31	Boroi	Ziziphus mauritiana Lam.	Rhamnaceae	T
32	Korobi	Sarcochlamys pulcherrima Gaudich.	Urticaceae	S

The present study indicated that a total of 32 species were found as homestead species and each family contained less species than plane land areas. A total of 36% (100 ha) land is used for cultivation purposes. The entire land has consisted of sand and calcium carbonated (CaCO₃) which is created unsuitable for arable. Modern planting materials and new agricultural instruments are insufficient in St. Martin`s Island. Besides, the environmental parameters show adverse effects on the crops and cultivation in each season.

The maximum Islanders are directly involved in the catching of fish from the Bay of Bengal. Therefore, some people are engaged in cultivation related professions. Maximum cultivators are unskilled and they are deprived of modern technical knowledge. The farmers cultivate the above plant species from generation to generation. The present study revealed that a total of 13 species were recorded as cultivated plant species in St. Martin`s Island (Table 5).

Table 5. Cultivated plants species in St. Martin`s

Sl. No	Bengal name	Scientific name	Family	Nature of plants
1	Piaj	Allium cepa L.	Liliaceae	Herb
2	Kachu	Alocasiaacuminata L.	Araceae	Herb
3	Supari	Areca catechu L.	Arecaceae	Tree
4	Sarisa	Brassica campestrisL.	Brassicaceae	Herb
5	Bandhacopi	Brassica capitala L.	Brassicaceae	Herb
6	Fulcopy	Brassica oleracea L.	Brassicaceae	Herb
7	Marich	Capsicum frutescens L.	Solanaceae	Herb
8	Tormuj	CitrulluslanatusThunb.	Cucurbitaceae	Herb
9	Narical	Cocos nucifera L.	Arecaceae	Tree
10	Dhan	Oryza sativa L.	Poaceae	Herb
11	Red mula	Raphanussativus L.	Brassicaceae	Herb
12	Tomato	SolanumlycopersicumL.	Solanacea	Herb
13	Potato	Solanumtuberosum L.	Solanaceae	Herb

Maximum crops are included of indigenous and high yielding species (hybrid) is slowly introduced day by day. *Oryza sativa* is also cultivated as sporadic conditions which were observed in the research period, but insufficient and maximum foods come from the mainland of Bangladesh. Five branched *Allium cepa* L. and waved *Solanumlycopersicum* L. are also available cultivated in the Island still today. Many scientists think that these are our indigenous cultivated spices (Pasha and Uddin, 2012) and it is the last address of the two indigenous species.

The present environmental condition of St. Martin`s is degraded due to anthropogenic activities. There are some seasonal shops to and fro in the total Island which provide foods, colorful

caps and other marine ornaments to the tourist at a high price. There is no strong restriction for making of shops, hotels, restaurants and even temporary house making. Many scientists suggested that St. Martin`s Island loss her heritage due to the unregulating development (Kabir, 2006). A total number of 78 species belonging to 40 families were identified. There were 22 families (group-1) which represented single number of species, 8 families contained 2 species (group-2), 5 families contained 3 species (group -3), Anacardiaceae contained 4 species, Convolvulaceae, Poaceae and Verbenaceae contained 5 species (each), and Fabaceae contained 6 species which was the highest number of the species (Fig. 2).

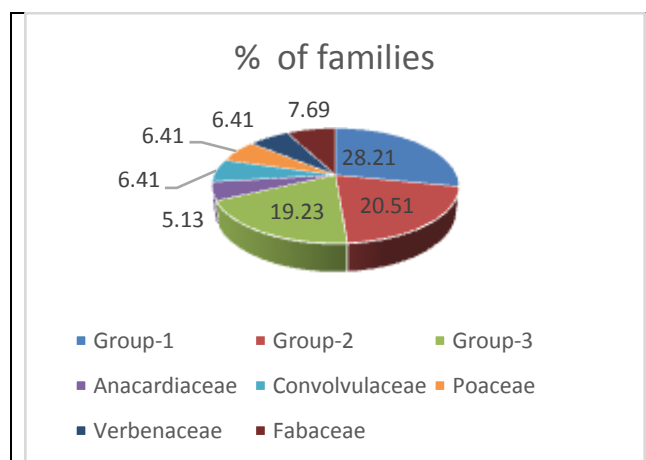


Fig. 2. Numbers of species in families wise

The findings of the study indicate that, each family contains less number of species than plane land. Many scientists and some institutes suggested that, all of these biodiversity have a great ecological value for sustainability of the island

though currently they are in great threat (World Bank, 2000; NACOM, 2009). All kinds of plants were recorded on the basis of the herb, shrub and tree in the present study. The maximum land is inaugurated with saline water during the tidal

period. This is main cause of scarcity of plant diversity in St. Martin's Island. Trees, herbs and

shrubs species were recoded **6%, 31% and 6% respectively (Fig. 3).**

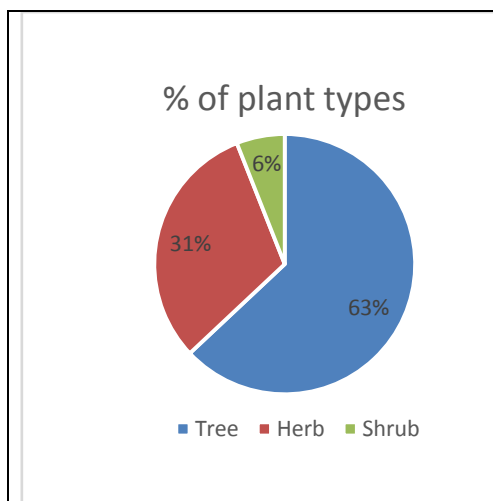


Fig. 3. Percentage of herb shrub and tree species in the study area

St. Marin's Island is a nature's gift and the government of Bangladesh has taken some steps to protect it. The application of ethical concepts like animal liberation or right, biocentrism, and eco-centrism can support to protect and enhance biodiversity growth in the island. Justification of the social, economic and ecological value of biodiversity can awaken such an attitude among community people and tourists which will be beneficial to conserve and protect biodiversity. Contrary, reproduction center and reserved areas should be introduced as well as some human activities must be banned such as coral, fish, crabs, sea turtles and algae etc. collection from nearby areas and temporary hotels, and restaurants surrounding beach.

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- A taxonomic report on the angiospermic flora of St. Martin's island [Bangladesh] [1984]**
Khan, M.S.; Hassan, M.A. (Dhaka Univ. (Bangladesh). Dept. of Botany);
A taxonomic survey of the Angiosperm vegetation of St. Martin's Island, Bangladesh, has been done. In all 230 specimens were collected and studies including 104 genera and 137 species under 41 families of both Dicots and Monocots. The distribution of the various associations of vegetation on the Island is recorded and the taxa are enumerated