

## TAXONOMIC STUDY ON THE ANGIOSPERMS OF CHAR KUKRI MUKRI WILDLIFE SANCTUARY, BHOLA DISTRICT

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### Abstract

The paper presents the status of angiospermic flora of Char Kukri Mukri Wildlife Sanctuary, a small Island in the Bay of Bengal close to the Char Fassion Upazila of Bhola district. A total of 277 plant species belonging to 76 families was identified from the Island. For each plant species data on scientific name, local name, family, life form and habitat were provided. Trees of this Island were represented by 91, shrubs by 33, herbs by 118 and climbers by 35 species. The plant species recorded from the island were distributed in different habitats. Among the habitats, maximum species were recorded in homesteads (104) followed by roadsides (79), mangrove areas (47) and cultivated land (47). The study has reported the presence of medicinal plants, wildlife supporting plants, exotics and invasive plants, rare and threatened plants in the Island. The presence of fruit bearing species in the island is very rare because of high salinity. The introduction of exotics and invasive species into the Island has been recognized as the great challenges to the local angiospermic flora in future. This article also highlights the conservation values, management concerns and some measures for conservation of angiosperm diversity in the Island.

*Key words:* Taxonomic study, Angiosperms, Char Kukri Mukri, Bhola District

### Introduction

Char Kukri Mukri Island is located in the southern side of Char Fassion Upazila of Bhola district is isolated from the main land facing the Bay of Bengal. The total area of the island is about 40 km<sup>2</sup>. According to local people, human habitation started in the island approximately from 1930 during the British regime. The island was inundated by a big cyclone in 1970 and washed away almost all the people. After the cyclone people again migrated from the main land to the area for fishing and built temporary houses. During the year of 1973/1974, Bangladesh Forest Department started forestation program using the species of *Sonneratia apetala* (Keora), *Avicennia officinalis* (Baine) and *Excoecaria agallocha* (Geoa) in all around the Island. The present planted forest area is about 11307.42 ha (Personal communication with local forest office). Among the forest area, 4973.43 ha is managed by Sadar forest beat and 1360.99 ha by Char Patila beat. The forest is now very dense with many other associated species. Bangladesh Forest Research Institute (BFRI) had introduced plantation trial unit in the island using local mangrove species and some other mesophytic plant species. Such plantation has been performing better in the intertidal zone. The forest bed is muddy and inundated by tidal actions twice

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in a day. The Island is also dissected by 6 small canals and its center part is under huge rice cultivation and human habitation located along the flood protected dams. The soil of the forest is highly alkaline. In 1981, under the Bangladesh Wildlife (Preservation) Amendment Act of 1947, Bangladesh Government has declared the forest area of Char Kukri Mukri as wildlife sanctuary for the protection of its biodiversity. Currently the Island is the dwelling place for 15000 people. The area enjoys a moist tropical maritime climate and rainfall is frequent and heavy during the monsoon season (May to October) ranging between 142 mm to 1044 mm. Temperature ranges from 16°C to 33°C, whereas humidity ranges from 29% to 99% (BBS 2011).

The diversity of plants is very much essential in shaping human civilization in modern days. Unfortunately, such diversity has been eroding in alarming rate from the nature before evaluation and documentation. At the end of 19th century the head of states from all over the world had realized this burning issue. World leaders met in Rieo De Janeiro de Janeiro in 1992 to formulate biodiversity conservation policy including agenda 21 which had also given emphasis on the documentation and sustainable utilization of traditional knowledge of plant diversity. After the convention the assessment works of plant diversity in different countries of the world is in progress. In case of Bangladesh angiosperm diversity assessment of different national parks and wildlife sanctuary has already been started (Khan *et al.* 1994, Rahman and Hassan 1995, Uddin *et al.* 1998, Uddin and Rahman 1999, Khan and Huq 2001, Uddin *et al.* 2011, Uddin and Hassan 2004, 2010, Uddin *et al.* 2013, Uddin *et al.* 2015 and Sajib *et al.* 2015). Literature survey revealed that there is no works on the documentation of the angiosperm flora of Char Kukri Mukri wildlife sanctuary. For the management of the sanctuary, baseline data on the flora are essential. In the present study an attempt was made to attain the following objectives: to document the angiosperms, to identify management concerns of the island and to suggest some conservation measures for Char Kukri Mukri wildlife sanctuary.

### **Materials and Methods**

Extensive floristic survey (Hyland 1972, Balick *et al.* 1982 and Alexiades 1996) was done in different seasons of the year of 2014 and 2015. The survey included mangrove, cultivated land, roadside and homestead area. Special efforts were given to find species of conservation concern including threatened, endemic and rare species. Sample size was determined using species area curve or species time curve (Goldsmith and Harrison 1976). Maximum identification was done in the field sites and in case of confusion in identification, representative plant specimens were collected and processed using standard herbarium techniques (Hyland 1972). Identification was done by consulting different Floras (Uddin and Hassan 2004, Siddiqui *et al.* 2007 and Ahmed *et al.* 2008a, 2008b, 2009a, 2009b, 2009c, 2009d, 2009e). The updated nomenclature of the species are included by following Siddiqui *et al.* 2007 and Ahmed *et al.* 2008a, 2008b, 2009a, 2009b,

2009c, 2009d, 2009e). Threatened categories of plants were confirmed with the help of Khan *et al.* (2001) and Ara *et al.* (2013). Some noxious exotic plant species were also identified comparing with the reports of Hossain and Pasha (2004) and Akter and Zuberi (2009). Families were arranged according to Cronquist (1981). Voucher specimens are preserved at Dhaka University Salar Khan Herbarium (DUSH).

### Results and Discussion

A total of 277 plant species belonging to 76 families was identified from the Char Kukri Mukri Island. For each plant species scientific name, local name, family, life form and habitat are presented in Table 1. Among the families, Cyperaceae, Poaceae, Fabaceae, Convolvulaceae, Asteraceae, Mimosaceae, Caesalpiniaceae, Euphorbiaceae, Verbenaceae, Amaranthaceae and Acanthaceae were found to be most common. Of 277 species, trees were represented by 91, shrubs by 33, herbs by 118 and climbers by 35 species. The plant species recorded from the island were found to be distributed in different habitats. Among the habitats, maximum species were recorded in the homesteads (104) followed by roadsides (79), mangrove areas (47) and cultivated land (47). Most of the plant species in the homesteads and roadsides were introduced by local people, forest department, forest research institute, enthusiastic people and local government. The number of fruit bearing plants was minimum in the island because of high salinity. During survey much attention was paid in the following habitats:

The mangrove plantations were developed all around the island. Each year the newly accreted lands facing the sea were undertaken by forest department under plantation programs. The top canopy in the mangrove was occupied by *Sonneratia apetala*, *Sonneratia caseolaris*, *Avicennia officinalis*, *Excoecaria agallocha* and *Bruguiera gymnorrhiza*. Besides few representations of *Heritiera fomes*, *Xylocarpus granatum*, *Xylocarpus moluccensis*, *Cerbera mangus*, *Ceriops decandra*, *Dolichandrona spathacea*, *Aegiceros corniculata* were also detected in forest. The forest ground was covered mainly by, the seedlings of *Excoecaria agallocha*, *Sonneratia apetala*, and *Avicennia officinalis*. In the forest edge the bush forming dominant species were *Acanthus ilicifolius*, *Dalbergia spinosa*, *Nipa fruticans*, *Hibiscus populnea*, *Thespesia lampus*, *Sapium indicum* and *Excoecaria agallocha*. The ground near the intertidal zone was mainly dominated by *Porteresia coarctata*, *Zoysia matrella*, *Cryptocoryne retrospiralis*, *Zoysia tenuifolia* and *Saccharum spontaneum*. Most common climbers in the mangrove forest were *Derris scandens*, *Derris trifolia*, *Flagellaria indica*, *Ipomoea litoralis*, and *Cercolobus carinatus*. Some members of sedge species including *Cyperus difformis*, *Cyperus eragrostis*, *Cyperus imbricatus* and *Cyperus lucidus* were observed in this zone. The banks of the tidal canals were dominated by a good number of tree species such as *Pongamia pinnata*, *Barringtonia acutangula*, *Trewia polycarpa*, *Crataeva nurvala*, *Heritiera fomes*, *Nipa fruticans*, *Tamarindus indica*, *Sonneratia apetala*, *Avicennia officinalis*, *Sonneratia caseolaris*, *Samanea saman*, *Albizia procera*, *Hibiscus populnea*, *Xylocarpus granatum*, *Calophyllum innophyllum*, *Acacia catechu* and *Albizia recardiana*.

Table 1. Angiosperms flora of Char Kukri Mukri Island.

Scientific name	Local name	Family	Habit	Habitat
<i>Abelmoschus moschatus</i> Medic.	Bonderos	Malvaceae	H	Roadside
<i>Ablemoschus esculentus</i> (L.) Moench	bendi	Malvaceae	H	Homestead
<i>Abutilon indicum</i> (L.) Sweet	-	Malvaceae	S	Roadside
<i>Acacia auriculiformis</i> A. Cunn. Ex Benth. & Hook.	Acashmoni	Mimosaceae	T	Roadside
<i>Acacia catechu</i> (L.f.) Willd.	Khiababla	Mimosaceae	T	Roadside
<i>Acacia mangium</i> Willd.	Belgium	Mimosaceae	T	Roadside
<i>Acacia nilotica</i> L.	Babla	Mimosaceae	T	Homestead
<i>Acanthus ilicifolius</i> L.	Hargoza	Acanthaceae	S	Mangrove
<i>Achyranthes aspera</i> L.	Upathlenga	Amaranthaceae	H	Homestead
<i>Adenanthera pavonina</i> L.	Lalchandon	Mimosaceae	T	Homestead
<i>Adhatoda zeylanica</i> Medikus	Bashak	Acanthaceae	S	Homestead
<i>Aegiceras corniculata</i> (L.) Blanco	Khulshi	Myrsinaceae	S	Mangrove
<i>Aegle marmelose</i> (L.) Corr.	Bel	Rutaceae	T	Homestead
<i>Ageratum conyzoides</i> (L.) L.	Fulkuri	Asteraceae	H	Roadside
<i>Albizia lebeck</i> (L.) Benth. & Hook.	Shilkoroi	Mimosaceae	T	Homestead
<i>Albizia procera</i> (Roxb.) Benth.	Sadakoroi	Mimosaceae	T	Homestead
<i>Albizia richardiana</i> (Voigt.) King & Prain.	Shiris	Mimosaceae	T	Homestead
<i>Albizia saman</i> (Jacq.) Merr.	Botkoroi	Mimosaceae	T	Homestead
<i>Allium tuberosum</i> Rottler ex Spreng.	Chinese leek	Liliaceae	H	Homestead
<i>Alocasia macrorrhizos</i> (L.) G. Don	Mankachu	Araceae	H	Homestead
<i>Alternanthera philoxeroides</i> (Mart.) Griseb.	Helencha	Amaranthaceae	H	Cultivated land
<i>Alternanthera sessilis</i> (L.) R. Br. Ex DC.	Hainchashak	Amaranthaceae	H	Cultivated land
<i>Amaranthus gangeticus</i> L.	Lashak	Amaranthaceae	H	Homestead
<i>Amaranthus spinosus</i> L.	Kantanote	Amaranthaceae	H	Roadside
<i>Amaranthus viridis</i> L.	Data shak	Amaranthaceae	H	Homestead
<i>Anacardium occidentale</i> L.	Kajubadam	Anacardiaceae	T	Homestead
<i>Annona squamosa</i> L.	Ata	Annonaceae	T	Homestead
<i>Anodendron paniculatum</i> (Roxb.) A. DC.	-	Asclepiadaceae	C	Mangrove
<i>Anthocephalus cadamba</i> (Roxb.) Miq.	Kadam	Rubiaceae	T	Homestead
<i>Aphanamixis polystachya</i> (Wall.) R. N. Parker	Pitraj	Meliaceae	T	Homestead
<i>Aphania danura</i> (Roxb.) Radlk.	Apin	Sapindaceae	S	Roadside
<i>Areca catechu</i> L.	Supari	Arecaceae	T	Homestead
<i>Argyreia argentea</i> (Roxb.) Choisy	-	Convolvulaceae	C	Roadside
<i>Artocarpus heterophyllus</i> Lamk.	Kathal	Moraceae	T	Roadside
<i>Artocarpus lacucha</i> Buch.-Ham.	Dewa	Moraceae	T	Homestead
<i>Averrhoa carambola</i> L.	Kamranga	Averrhoaceae	T	Homestead
<i>Avicennia officinalis</i> L.	Baine	Verbenaceae	T	Mangrove

Contd.

Scientific name	Local name	Family	Habit	Habitat
<i>Axonopus compressus</i> (Sw.) P. Beauv.	Dhakagass	Poaceae	H	Roadside
<i>Azadirachta indica</i> A. Juss.	Neem	Meliaceae	T	Homestead
<i>Bacopa monnieri</i> (L.) Pennell	Brammi Shak	Scrophulariaceae	H	Mangrove
<i>Bambusa balcooa</i> Roxb.	Baijja Bans	Poaceae	T	Homestead
<i>Barringtonia acutangula</i> (L.) Gaertn.	Hizol	Lecythidaceae	T	Mangrove
<i>Basella rubra</i> L.	Puishak	Basellaceae	C	Homestead
<i>Bauhinia purpurea</i> L.	Kanchan	Caesalpiniaceae	T	Homestead
<i>Benincasa hispida</i> (Thunb.) Cogn.	Chalkumra	Cucurbitaceae	C	Homestead
<i>Blumea lacera</i> (Burm. f.) DC.	Kukurmuta	Asteraceae	H	Roadside
<i>Blumea membranacea</i> Wall.ex DC.	Kukurmuta	Asteraceae	H	Roadside
<i>Bombax ceiba</i> L.	Shimultula	Bombacaceae	T	Homestead
<i>Borassus flabellifer</i> L.	Tal	Arecaceae	T	Roadside
<i>Breynia retusa</i> (Dnnst.) Alston.	-	Euphorbiaceae	S	Roadside
<i>Bruguiera gymnorhiza</i> (L.) Lamk.	Kakra	Rhizophoraceae	T	Mangrove
<i>Bryophyllum pinnatum</i> (Lamk.) Oken	Pathorkusi	Crassulaceae	H	Homestead
<i>Caesalpinia bunduc</i> (L.) Roxb.	Neta	Caesalpiniaceae	C	Roadside
<i>Caesalpinia crista</i> L.	-	Caesalpiniaceae	C	Roadside
<i>Cajanus cajan</i> (L.) Millsp.	Orhor	Fabaceae	S	Roadside
<i>Calamus guruba</i> BUch.-Ham. Ex Martius	Bet	Arecaceae	C	Roadside
<i>Calophyllum innophyllum</i> L.	Kunail	Clusiaceae	T	Roadside
<i>Calotropis gigantea</i> (L.) R. Br.	Akanda	Asclepiadaceae	S	Roadside
<i>Calotropis procera</i> (Aiton) Dryand	Akand	Asclepiadaceae	S	Roadside
<i>Canavalia ensiformis</i> (L.) DC.	Moiseem	Fabaceae	C	Roadside
<i>Canavalia maritima</i> Thou.	-	Fabaceae	C	Roadside
<i>Capsicum frutescens</i> L.	Morich	Solanaceae	H	Cultivated lanc
<i>Carex caricinus</i> L.	Sedge	Cyperaceae	H	Mangrove
<i>Carica papaya</i> L.	Pepe	Caricaceae	S	Homestead
<i>Cassia alata</i> L.	Dadmordan	Caesalpiniaceae	S	Homestead
<i>Cassia fistula</i> L.	Sonalu	Caesalpiniaceae	T	Roadside
<i>Cassia occidentalis</i> L.	-	Caesalpiniaceae	H	Roadside
<i>Cassia siamea</i> Lamk.	Minjori	Caesalpiniaceae	T	Roadside
<i>Cassia tora</i> L.	-	Caesalpiniaceae	H	Roadside
<i>Casuarina equisetifolia</i> L.	Jau	Casuarinaceae	T	Roadside
<i>Cayratia japonica</i> (Thunb.) Gagnep.	-	Vitaceae	C	Roadside
<i>Celosia cristata</i> L.	Morogful	Amaranthaceae	H	Homestead
<i>Centella asiatica</i> (L.) Urban	Adamoni	Apiaceae	H	Roadside
<i>Cerbera manghas</i> L.	Cerbera	Apocynaceae	T	Mangrove
<i>Ceriops decandra</i> (Griff.) Ding. Hou	Goran	Rhizophoraceae	T	Mangrove
<i>Chrysalidocarpus lutescens</i> (Bory) H. Wendl.	Arecapalm	Arecaceae	T	Homestead
<i>Chrysopogon aciculatus</i> (Retz.) Trin.	Premkanta	Poaceae	H	Roadside
<i>Citrus aurantifolia</i> (Christm.&Panzer) Swingle	Lebu	Rutaceae	S	Homestead

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Scientific name	Local name	Family	Habit	Habitat
<i>Citrus maxima</i> (Burm. F.) Merr.	Jambura	Rutaceae	T	Homestead
<i>Clerodendrum indicum</i> (L.) Kuntze	Bhat	Verbenaceae	S	Mangrove
<i>Clerodendrum inerme</i> (L.) Gaertn.	-	Verbenaceae	S	Magrove
<i>Clerodendrum Viscosum</i> Vent.	Bhat	Verbenaceae	H	Mangrove
<i>Clitorea turnetea</i> L.	Aparajita	Fabaceae	C	Homestead
<i>Cocos nucifera</i> L.	Narikel	Arecaceae	T	Homestead
<i>Codiaeum variegatum</i> (L.) A. Juss.	Patabahar	Euphorbiaceae	S	Homestead
<i>Coix lacryma-jobi</i> L.	-	Poaceae	H	Roadside
<i>Colocasia esculenta</i> (L.) Schott	Kachu	Araceae	H	Homestead
<i>Cotula hemispherica</i> (Roxb.) Wall.ex CB. Clarke	Cotula	Asteraceae	H	Cultivated land
<i>Crateva nurvala</i> Buch.-Ham.	Borun	Capparadiaceae	T	Mangrove
<i>Crinum amoenum</i> Roxb.	Bonroshun	Liliaceae	H	Mangrove
<i>Crinum asiaticum</i> L.	Crinum	Liliaceae	H	Mangrove
<i>Crotalaria juncea</i> L.	Junjuni	Fabaceae	H	Roadside
<i>Croton bonplandianus</i> Baill.	Bankhira	Euphorbiaceae	H	Roadside
<i>Chrozophora plicata</i> (Vahl.) A. Juss. ex. Spreng.	-	Euphorbiaceae	H	Roadside
<i>Cryptocoryne retrospiralis</i> (Roxb.) Fisch.	Kelakachu	Araceae	H	Mangrove
<i>Cucurbita maxima</i> Duchesne	Misti kumra	Cucurbitaceae	C	Homestead
<i>Curcuma domestica</i> Valet.	Halud	Zingiberaceae	H	Homestead
<i>Curcuma gedoaria</i> (Christm.) Rosc.	Shadi	Zingiberaceae	H	Roadside
<i>Cuscuta reflexa</i> Roxb.	Shwamalata	Cuscutaceae	C	Roadside
<i>Cyclea barbata</i> Miers.	Patalpur	Menispermaceae	C	Roadside
<i>Cynodon dactylon</i> (L.) Pers.	Durbagass	Poaceae	H	Homestead
<i>Cynometra ramiflora</i> L.	Singra	Fabaceae	T	Mangrove
<i>Cyperus difformis</i> L.	Sedge	Cyperaceae	H	Mangrove
<i>Cyperus eragrostis</i> Vahl.	Sedge	Cyperaceae	H	Mangrove
<i>Cyperus imbricatus</i> Retz.	Sedge	Cyperaceae	H	Mangrove
<i>Cyperus lucidus</i>	Sedge	Cyperaceae	H	Mangrove
<i>Cyperus rotundus</i> L.	Muthagass	Cyperaceae	H	Cultivated land
<i>Dalbergia sissoo</i> DC.	Shissu	Fabaceae	T	Roadside
<i>Dalbergia spinosa</i> Roxb.	Tamu	Fabaceae	S	Mangrove
<i>Delonix regia</i> Rafin.	Krishnachura	Caesalpiniaceae	T	Roadside
<i>Dentella repens</i> (L.) J. R. & G. Forst.	Bhuipat	Rubiaceae	H	Cultivated land
<i>Derris scandens</i> (Roxb.) Benth.	Kalilata	Fabaceae	C	Mangrove
<i>Derris trifoliata</i> Lour.	Kalilota	Fabaceae	C	Mangrove
<i>Dillenia indica</i> L.	Chalta	Dilleniaceae	T	Homestead
<i>Dioscorea alata</i> L.	Jora alu	Dioscoriaceae	C	Homestead
<i>Dioscorea bulbifera</i> L.	Matialu	Dioscoriaceae	C	Homestead
<i>Diospyros blancoi</i> A. DC.	Bilatigab	Ebenaceae	T	Homestead
<i>Diospyros malabarica</i> (Desr.) Kostel.	Deshigab	Ebenaceae	T	Homestead
<i>Dolichandrone spathacea</i> (L.f.) K. Schum.	Chamhechandand	Bignoniaceae	T	Mangrove

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Scientific name	Local name	Family	Habit	Habitat
<i>Eclipta prostrata</i> (L.) Mant.	Keshoraj	Asteraceae	H	Cultivated land
<i>Ehretia serrata</i> Roxb.		Boraginaceae	T	Roadside
<i>Eichhornia crassipes</i> (Mart.) Solms	Kachripana	Pontederiaceae	H	Homestead
<i>Elaeocarpus tectorius</i> (Lour.) Poir.	Jolpai	Elaeocarpaceae	T	Cultivated land
<i>Eleocharis geniculata</i> (L.) Roem. & Schult.	Joraghasi	Cyperaceae	H	Cultivated land
<i>Eleusine indica</i> (L.) Gaertn.	Malankuri	Poaceae	H	Cultivated land
<i>Eryngium foetidum</i> L.	Shamadoine	Apiaceae	H	Homestead
<i>Erythrina indica</i> Lamk.	Painnamandar	Fabaceae	T	Homestead
<i>Erythrina ovalifolia</i> Roxb.	Mandar	Fabaceae	T	Homestead
<i>Eucalyptus camaldulensis</i> Dehnhardt	Eucalyptus	Myrtaceae	T	Roadside
<i>Excoecaria agallocha</i> L.	Geoa	Euphorbiaceae	T	Mangrove
<i>Ficus benghalensis</i> L.	Bot	Moraceae	T	Roadside
<i>Ficus hispida</i> L. f.	Dumur	Moraceae	T	Homestead
<i>Ficus infectoria</i> Roxb.	Pakur	Moraceae	T	Roadside
<i>Ficus racemosa</i> L.	Jogdumur	Moraceae	T	Roadside
<i>Ficus rumphii</i> Blume.	Pakur	Moraceae	T	Roadside
<i>Fimbristylis acuminata</i> Vahl	-	Cyperaceae	H	Cultivated land
<i>Fimbristylis dichotoma</i> (L.) Vahl	Fimbristylis	Cyperaceae	H	Roadside
<i>Fimbristylis ferruginea</i> (L.) Vahl	-	Cyperaceae	H	Cultivated land
<i>Flcourtia indica</i> (Burm.f.) Merr.	Paniala	Flacourtiaceae	T	Homestead
<i>Flumeria alba</i> L.	Katgolap	Combretaceae	T	Homestead
<i>Flagellaria indica</i> L.		Flagellariaceae	C	Mangrove
<i>Garcinia cowa</i> Roxb. ex DC.	Kao	Clusiaceae	T	Homestead
<i>Gardenia jasminoides</i> J.Ellis	Gandhraj	Rubiaceae	S	Homestead
<i>Gmelina arborea</i> Roxb.	Gamari	Verbenaceae	T	Roadside
<i>Gomphrena globosa</i> L.	Botamphul	Amaranthaceae	H	Roadside
<i>Gosypium herbaceum</i> L.	Karpustula	Malvaceae	H	Roadside
<i>Grangea maderaspatana</i> (L.) Poir.	Nemuti	Asteraceae	H	Cultivated land
<i>Heliotropium curassavicum</i> L.	Nuinna	Boraginaceae	H	Cultivated land
<i>Heliotropium indicum</i> L.	Hatisur	Boraginaceae	H	Cultivated land
<i>Heritiera fomes</i> Buch.-Ham.	Sundari	Sterculiaceae	T	Mangrove
<i>Hibiscus rosa-sinensis</i> L.	Joba	Malvaceae	S	Homestead
<i>Hydrilla verticillata</i> (L.f.) Royle	Jaji	Hydrocharitaceae	H	Cultivated land
<i>Hygrophila phlomoides</i> Nees	-	Acanthaceae	H	Cultivated land
<i>Hygrophila salicifolia</i> (Vahl) Nees	Kakmasha	Acanthaceae	H	Cultivated land
<i>Imperata cylindrica</i> (L.) P.Beauv.	Ulu	Poaceae	H	Roadside
<i>Ipomea batata</i> (L.) Lamk.	Mistialu	Convolvulaceae	C	Homestead
<i>Ipomoea aquatica</i> Forssk.	Kolmi	Convolvulaceae	H	Homestead
<i>Ipomoea fistulosa</i> Mart. ex Choisy	Dolkolmi	Convolvulaceae	H	Roadside
<i>Ipomoea littoralis</i> Blume.	-	Convolvulaceae	C	Mangrove
<i>Ipomoea pes-caprae</i> (L.) R. Br.	Chagalkhuri	Convolvulaceae	H	Cultivated land
<i>Justicia gendarussa</i> Burm.f.	Justicia	Acanthaceae	H	Roadside
<i>Kyllinga sesquiflora</i> Torr.	Sedge	Cyperaceae	H	Cultivated land

Contd.

Scientific name	Local name	Family	Habit	Habitat
<i>Kyllinga nemoralis</i> (J.R.Forst. & G. Forst) Dandy ex Hutchins&Dalziel	Sedge	Cyperaceae	H	Cultivated land
<i>Lablab purpurea</i> (L.) Sweet	Seem	Fabaceae	C	Homestead
<i>Lagenaria siceraria</i> (Molina) Standl.	Lao	Cucurbitaceae	C	Homestead
<i>Lagerstroemia indica</i> L.	Cheri	Lythraceae	T	Homestead
<i>Lagerstroemia speciosa</i> (L.) Pers.	Jarul	Lythraceae	T	Homestead
<i>Lansea coromandelica</i> (Houtt.) Merr.	Bhadi	Anacardiaceae	T	Homestead
<i>Lathyrus sativus</i> L.	Khesari	Fabaceae	H	Cultivated land
<i>Lawsonia inermis</i> L.	Mehendi	Lythraceae	T	Homestead
<i>Leucaena leucocephala</i> (Lamk.) de Wit.	Epilepil	Mimosaceae	T	Roadside
<i>Lindernia indica</i>	-	Scrophulariaceae	H	Cultivated land
<i>Lippia alba</i> (Mill.) N. E. Br. Ex Britt. &Wilson	Bhuiokra	Verbenaceae	H	Roadside
<i>Litchi chinensis</i> Sonn.	Lichu	Sapindaceae	T	Homestead
<i>Ludwigia hyssopifolia</i> G. Don Excell apud A &R. Fernandes	Panilong	Onagraceae	H	Cultivated land
<i>Ludwigia repens</i> Forst.	Molsi	Onagraceae	H	Cultivatedland
<i>Luffa cylindrical</i> (L.) M. Roem.	Dundul	Cucurbitaceae	C	Homestead
<i>Mangifera indica</i> L.	Aam	Anacardiaceae	T	Homestead
<i>Mariscus squarrosus</i> (L.) C. B. Clarke	Sedge	Cyperaceae	H	Cultivated land
<i>Melia azederach</i> L.	Goraneem	Meliaceae	T	Homestead
<i>Merremia peltata</i> (L.) Hallier f.	-	Convolvulaceae	C	Roadside
<i>Merremia umbelata</i> (L.) Hallier f.	merrimia	Convolvulaceae	C	Roadside
<i>Mikania micrantha</i> Kunth	Assamilata	Asteraceae	C	Roadside
<i>Momordica cochinchinensis</i> (Lour.) Spreng	Bonkakrol	Cucurbitaceae	C	Roadside
<i>Morinda citrifolia</i> L.	Banach	Rubiaceae	S	Homestead
<i>Moringa oleifera</i> Lamk.	Shajna	Moringaceae	T	Homestead
<i>Mosla dainthera</i> (Buch.-Ham. ex Roxb.)Maxim.	-	Lamiaceae	H	Homestead
<i>Mucuna gigantea</i> (Willd.) DC.	Bara-alkuchi	Fabaceae	C	Roadside
<i>Musa paradisiaca</i> L.	Kola	Musaceae	H	Homestead
<i>Nelsonia canescens</i> (Lamk.) Spreng.	-	Acanthaceae	H	Roadside
<i>Nerium indicum</i> Mill.	Korobi	Apocynaceae	S	Roadside
<i>Nymphaea alba</i> L.	Shadashapla	Nymphaeaceae	H	Cultivated land
<i>Nymphaea nauchali</i> Burm.	Shapla	Nymphaeaceae	H	Cultivated land
<i>Nymphaea rubra</i> Roxb. Ex Andr.	Lalshapla	Nymphaeaceae	H	Cultivated land
<i>Nymphaea pubescens</i> Willd.	Shapla	Nymphaeaceae	H	Cultivated land
<i>Nypa fruticans</i> Wurmb.	Goalpata	Arecaceae	S	Mangrove
<i>Ocimum sanctum</i> L.	Tulsi	Lamiaceae	H	Homestead
<i>Operculina turpethum</i> (L.) S. Manso.	-	Convolvulaceae	C	Roadside
<i>Oryza sativa</i> L.	Motadhan	Poaceae	H	Cultivated land
<i>Oxalis corniculata</i> L.	Amrul	Oxalidaceae	H	Roadside



Contd.

Scientific name	Local name	Family	Habit	Habitat
<i>Paspalum distichum</i> L.	Gitlaghas	Poaceae	H	Cultivated land
<i>Paspalum vaginatum</i> Sw.	-	Poaceae	H	Meadow
<i>Pedilanthus tithymaloides</i> Poit.	Chita	Euphorbiaceae	H	Homestead
<i>Pendanus foetida</i>	Keakanta	Pandanaceae	H	Cultivated land
<i>Phaulopsis imbricata</i> (Forssk.) Sweet	Kantasi	Acanthaceae	H	Roadside
<i>Phoenix paludosa</i> Roxb.	Hetal	Arecaceae	S	Mangrove
<i>Phoenix sylvestris</i> (L.)Roxb.	Khejur	Arecaceae	T	Roadside
<i>Phragmites karka</i> (Retz.) Trin.ex. steud.	Nol	Poaceae	H	Mangrove
<i>Phyla nodiflora</i> (L.) Greene	Kanghas	Verbenaceae	H	Cultivated land
<i>Phyllanthus reticulatus</i> Poir.	Sitki	Euphorbiaceae	S	Roadside
<i>Physalis minima</i> L.	Potpoti	Solanaceae	H	Roadside
<i>Pithecellobium dulce</i> (Roxb.) Benth.	Khoibabla	Mimosaceae	T	Homestead
<i>Polygonum blebeium</i> R. Br.	-	Polygonaceae	H	Cultivated land
<i>Polygonum flaccidum</i> Roxb.	-	Polygonaceae	H	Cultivated land
<i>Pongamia pinnata</i> (L.) Pierre	Koroj	Caesalpiniaceae	T	Homestead
<i>Porteresia coarctata</i> (Roxb.) Tateoka	Urighass	Poaceae	H	Meadow
<i>Portulaca oleracea</i> L.	Nuainashak	Portulacaceae	H	Cultivated land
<i>Potamogeton pectinatus</i> L.	Gechu	Potamogetonaceae	H	Cultivated land
<i>Psidium guajaba</i> L.	Peara	Myrtaceae	T	Homestead
<i>Psilotrichum ferrugineum</i> (Roxb.) Moq.-Tand.	Putishak	Amaranthaceae	H	Cultivated land
<i>Psophocarpus tetragonolobus</i> (L.) DC.	Wingseem	Fabaceae	C	Homestead
<i>Punica granatum</i> L.	Dalim	Punicaceae	S	Homestead
<i>Raphanus sativus</i> L.	Mulashak	Brassicaceae	H	Cultivated land
<i>Ricinus communis</i> L.	Keron	Euphorbiaceae	S	Homestead
<i>Rotala indica</i> (Willd.) Koehne	-	Lythraceae	H	Cultivated land
<i>Ruelia tuberosa</i> L.	Ruelia	Acanthaceae	H	Roadside
<i>Saccharum officinerum</i> L.	Akh	Poaceae	H	Cultivated land
<i>Saccharum spontaneum</i> L.	Chan	Poaceae	H	Mangrove
<i>Sapium indicum</i> Willd.	Harua	Euphorbiaceae	T	Roadside
<i>Sarcolobus carinatus</i> Wall.	-	Asclepiadaceae	C	Mangrove
<i>Schumannianthus dichotomus</i> (Roxb.) Ganep.	Patipata	Meratnaceae	H	Homestead
<i>Scirpus articulatus</i> L.	Chesra	Cyperaceae	H	Cultivated land
<i>Scoparia dulcis</i> L.	Chinipata	Scropulariaceae	H	Homestead
<i>Sesbania grandiflora</i> (L.) Pers.	Bakul ful	Fabaceae	S	Homestead
<i>Siplanthes acmella</i> (L.) Murray not (L.) L.	Spilanthes	Asteraceae	H	Homestead
<i>Solanum indicum</i> Sensus C.B. Clark	Futki begun	Solanaceae	S	Homestead
<i>Solanum melogena</i> L.	Begun	Solanaceae	H	Homestead
<i>Solanum nigrum</i> L.	Titbegun	Solanaceae	H	Roadside
<i>Solanum virginianum</i> L.	Bonbegun	Solanaceae	H	Roadside
<i>Sonneratia apetala</i> Buch.-Ham.	Keora	Sonneratiaceae	T	Mangrove

Contd.

Scientific name	Local name	Family	Habit	Habitat
<i>Sonneratia caseolaris</i> (L.)Engl.	Soilla	Sonneratiaceae	T	Mangrove
<i>Spondias pinnata</i> (L. f.) Kurz.	Deshi amra	Anacardiaceae	T	Homestead
<i>Stephania japonica</i> (Thunb.) Miers	Muchchanilata	Menispermaceae	C	Roadside
<i>Swietenia mahagoni</i> (L.) Jacq.	Mehagoni	Meliaceae	T	Homestead
<i>Syzygium cumini</i> (L.) Skeels	Kalogram	Myrtaceae	T	Homestead
<i>Syzygium fruticosum</i> (Roxb.) DC.	Bhutijam	Myrtaceae	T	Homestead
<i>Syzygium malaccense</i> (L.) Merr. & L. M. Perry	Jamrul	Myrtaceae	T	Homestead
<i>Syzygium samaracens</i> (Blume) Merr. & Perry	Golapjam	Myrtaceae	T	Homestead
<i>Tabarnaemontana recurva</i> Roxb.	Togor	Apocynaceae	S	Homestead
<i>Tagetes patula</i> L.	Gada	Asteraceae	H	Homestead
<i>Tamarindus indica</i> L.	Tentul	Caesalpiniaceae	T	Homestead
<i>Tamarix gallica</i> L.	Nonajau	Tamaricaceae	S	Mangrove
<i>Terminalia arjuna</i> (Roxb. ex DC.) Wight & Arn.	Arjun	Combretaceae	T	Roadside
<i>Terminalia bellirica</i> (Gaertn.) Roxb.	Bohera	Combretaceae	T	Homestead
<i>Terminalia catappa</i> L.	Katgolap	Combretaceae	T	Homestead
<i>Terminalia chebula</i> (Gaertn.)Retz.	Bohera	Combretaceae	T	Homestead
<i>Thespesia lampas</i> (Cav.) Dalz. & Gibs	Boloi	Malvaceae	S	Mangrove
<i>Thespesia populnea</i> (L.) Sol. Ex Corr.	Shon boloi	Malvaceae	S	Mangrove
<i>Tilanthia phyloxerooides</i> (Mart.) Moq.	Tilanthia	Asteraceae	H	Cultivated land
<i>Tinospora cordifolia</i> (Willd.) Hook.f. & Thoms.	Gulancha	Menispermaceae	C	Homestead
<i>Toona ciliata</i> M. Roem.	Toon	Meliaceae	T	Roadside
<i>Trewia nudiflora</i> L.	Pidali	Euphorbiaceae	T	Homestead
<i>Typha elephantina</i> Roxb.	Hogla	Typhaceae	H	Cultivated land
<i>Urena lobata</i> L.	Jogagota	Malvaceae	H	Homestead
<i>Utricularia exoleata</i> R. Br.	Jhaji	Utriculariaceae	H	Cultivated land
<i>Vernonia cinerea</i> (L.) Less.	Kuksim	Asteraceae	H	Roadside
<i>Vigna unguiculata</i> (L.) Walp.	Borboti	Fabaceae	C	Homestead
<i>Vitex negundo</i> L.	Nishinda	Verbenaceae	S	Roadside
<i>Vitex trifolia</i> L.f.	Neelnishinda	Verbenaceae	S	Roadside
<i>Wedelia calendulacea</i> (L.) Less.	Mohabingaraj	Asteraceae	H	Mangrove
<i>Xanthium indicum</i> Koen. ex Roxb.	Ghagrashak	Asteraceae	H	Cultivated land
<i>Xanthosoma violaceum</i> Schott	Dudkachu	Araceae	H	Homestead
<i>Xylocarpus granatum</i> Koen.	Dundul	Meliaceae	T	Mangrove
<i>Xylocarpus moluccensis</i> (Lamk.) Roem.	Posur	Meliaceae	T	Mangrove
<i>Ziziphus mauritiana</i> Lamk.	Boroi	Rhamnaceae	T	Homestead
<i>Zoysia matrella</i> (L.) Merr.	Gass	Poaceae	H	Meadow
<i>Zoysia tenuifolia</i> Willd. ex Thiele	Gass	Poaceae	H	Meadow

(T = tree, S = shrub, H = herb, C = climber).

Two layers of dams were made all around the Island to save it from hurricane and high tidal surges. The dams are criss-cross by many roads made by the local government to facilitate communication among the people living in and around the dams. Such dams and roads were planted by the forest department using a number of both native and exotic species. The noteworthy species are *Samanea saman*, *Acacia catechu*, *Borassus flabelifer*, *Phoenix syvetris*, *Casuarina litoralis*, *Acacia auriculiformis*, *Acacia maengeum*, *Artocarpus heterophyllus*, *Calophyllum innophyllum*, *Eucalyptus camaldulensis*, *Dalbergia sissoo*, *Ehretia serrata*, *Ficus benghalensis*, *Sapium indicum*, *Toona ciliata*, *Gmelina arborea*, *Ficus racemosa*, *Leucaena leucocephala*, *Terminalia arjuna*, *Ficus rumphii*, *Excoecaria agallocha*, *Cassia siamea* and *Cassia fistula*. Some bushy plants were also found in both sides of the road. The major species are *Ricinus communis*, *Cajanus cajan*, *Sapium indicum*, *Excoecaria agallocha*, *Cassia alata*, *Calotropis procera*, *Calotropis gigantea*, *Hibiscus pupoinea* and *Vitex negundo*. Many climber species were also ornamented the road sides. Most common species are *Mikania cordata*, *Caesalpinia bunduc*, *Canavalia ensiformis*, *Cuscuta reflexa*, *Merremia umbellata*, *Operculina turpethum*, *Stephania japonica*, *Anodendron paniculatum* and *Canavalia maritima*.

Each homestead was planted by a good number of tree species. The appearance of such homestead looks like a segment of mini forest. During our survey *Moringa oleifera*, *Acacia nilotica*, *Aegle marmelose*, *Albizia lebbek*, *A. procera*, *A. richardiana*, *Samanea saman*, *Anacardium occidentale*, *Annona squamosa*, *Anthocephalus chinensis*, *Aphanamixis polystachya*, *Areca catechu*, *Artocarpus lacucha*, *Averrhoa carambola*, *Azadirachta indica*, *Bambusa balcooa*, *Bombax ceiba*, *Citrus maxima*, *Cocos nucifera*, *Ziziphus mauritiana*, *Trewia nudiflora*, *Terminalia chebula*, *Terminalia bellirica*, *Tamarindus indica*, *Syzygium malaccense*, *S. S. cumini*, *Swietenia mahagoni*, *Spondias pinnata*, *Psidium guajaba*, *Pongamia pinnata*, *Pithecellobium dulce*, *Melia azederach*, *Mangifera indica*, *Litchi chinensis*, *Lawsonia inermis*, *Lannea coromandelica*, *Erythrina indica*, *Diospyros malabarica* and *Diospyros blancoi* were recorded.

Apart from the dams and homesteads, maximum land of the island is highly fertile. Local people use such land ones in a year for rain feed aman rice and fish production. During winter and summer some of the lands are used for winter crops and summer crops. Winter and summer crops are chili, watermelon, sweetpumpkin, sweetpotato, tomato and legumes. Some aquatic seasonal plants grow in rainy season. The most common plants recorded are *Potamogeton pectinatus*, *Eichhornia crassipes*, *Jussiaea repen*, *Hydrila verticillata*, *Nymphaea pubescens*, *Nymphaea nouchali*, *Nymphaea rubra*, *Nymphaea capensis*, *Ipomoea aquatica*, *Tilanthera phyloxeroides*, *Alternanthera sessilis*, *Baccopa monnieri*, *Commelina benghalensis* and also a good number of sedges and grasses. In summer the land was covered by a number herbaceous plant. Among them the common species are *Baccopa monnieri*, *Dentella repens*, *Psilotrichum ferrugineum*, *Polygonum plebejum*, *Phyla nodiflora*, *Grangea madarspatana*, *Xanthium indicum*, *Portulaca oleracea*, *Heliotropium curassavicum*, *Heliotropium indicum*, *Eclipta prostrata* and

*Alternanthera sessilis*. A rare occurrence of *Typha elephantina* (Hogla) and *Phragmites karka* (Nol) was also recorded in the wetland.

The following five species occurring in the island seem to be rare in the habitat. These are *Sarcolobus carinatus*, *Tamarix gallica*, *Calophyllum inophyllum*, *Typha elephantana* and *Phragmites karka*. To confirm their status further detailed survey is needed. The survey also recorded the occurrence of one species, namely *Dolichandrone spathacea* (Ara *et al.* 2013) in the Island that had already been listed as threatened in Bangladesh. A good number of medicinal plants was identified that plays an important role for the primary healthcare of local people of the island. Priority should be given for their conservation. The recorded species in the Island are *Sonneratia apetala*, *Sonneratia caseolaris*, *Nipa fruticans*, *Centella asiatica*, *Mangifera indica*, *Scoparia dulcis*, *Mikania cordata*, *Ipomoea fistulosa*, *Kalanchoe pinnata*, *Terminalia arjuna*, *Stephania japonica*, *Cassia alata*, *Terminalia belliricha* (Bohera), *Diilena indica* (Chailta), *Terminalia chebula* (Horitaki), *Terminalia arjuna* (Arjun), *Eupatorium odoratum* (Pisais), *Mikania scandens* (Refugeelata), *Cynodon dactylon* (Durba), *Colocasia esculenta* (Kachu), and *Ficus racemosa* (Jogdumur).

Exotics and invasive species are a part of total floristic composition of the island. Some exotics, such as *Acacia auriculiformis*, *Acacia mengium*, *Eucalyptus camaldulensis*, *leucaena leucocephala*, and *Cassia siamea* were planted in the island area. Invasive species of the island are *Eichhornia crassipes*, *Mikania cordata* (Refugeelota), *Chromolaena odorata* (Pisais), *Ipomoea fistulosa*, *Ageratum conyzoides*, and *Xanthium indicum bonplandianum*. Such species are a challenge to the management of the plant diversity of the Island. A good number of wildlife supporting plant species namely by *Sonneratia apetala*, *Sonneratia caseolaris*, *Avicenneia alba*, *Ficus benghalensis*, *Ficus racemosa*, *Ficus rhumphii*, *Syzygium cummuni*, *Syzygium fruticosum* and *Tamarindus indica* was recorded from the island. Such species play an important role in conservation of biodiversity.

Char Kukri Mukri Island is very interesting area for eco-tourism. During this survey a number of features of the Island was indentified which has great values for conservation and ecotourism. Such features are to watch the isolated and remote Island facing to the Bay of Bengal; to watch the presence of coastal belt plantations turned into natural ecosystem; to enjoy mangrove forest; to observe the presence of introduced wildlife with their natural population; to meet friendly local people and also can enjoy local hospitality with fresh sea fish; to enjoy serene and virgin environment; to roaming and cruising all around the island by boat; to observe natural succession in the newly accreted Island; to provide huge opportunity for nature photographers; to watch shore and aquatic birds paradise.



Plate 1. a. *Calophyllum inophyllum*, b. *Sonneratia caseolaris*, c. *Thespesia lampas*, d. *Cerbera manghas*, e. *Derris scandens*, f. *Barringtonia acutangula*, g. *Avicennia officinalis*, h. *Nypa fruticans*, i. *Acanthus ilicifolius*, j. *Solanum virginianum*, k. *Ipomoea pes-caprae*, l. *Heritiera fomes*, m. *Sonneratia apetala*, n. *Crinum amoenum*, o. *Derris trifoliata*, p. *Dolichandrone spathacea*, q. *Heliotropium curassavicum*, r. *Thespesia populnea*, s. *Porteresia coarctata*, t. *Typha elephantine*, u. *Barringtonia acutangula*, v. *Flagillaria indica*, w. *Diospyros malabarica*, x. *Sapium indicum*.

Based on observations and discussion with local people and foresters it is evident that the island is not yet facing major threats. But the east part of the island is facing erosion

during rainy season. The species planted there are *Pongamia pinnata* (Koroz), *Barringtonia acutangula* (Hizol), *Crateva nurvala* (Baorun), *Trewia nudiflora* (Pidali) and *Acacia catechu* (Babla) all of which are fresh water enduring species. Initially such species were doing better in producing branches and canopy. But their root systems are poorly developed. During high tide period the wave actions made them uprooted easily. Mangrove species like *Sonneratia apetala* (Keora), *Sonneratia caseolaris* (Soila), *Avicennia officinalis* (Baine) and *Excoecaria agallocha* (Geoa) were found to grow well in the intertidal zone. They have strong root systems and can withstand with high wave action during rainy season. Navigation to the island is one of the major constrains. Facilities and man power of local forest department are not much adequate. Introduction of exotics by forest department and BFRI are also noticeable. Grazing by buffalos in the mangrove forest area and newly accreted lands were also observed.

In order to manage the Island local knowledge based policy is very necessary. During the field trips we discussed with local forest personals, local elites and general people to find some clues for formulating recommendations. A number of suggestions which are made based on our visit experiences are: to undertake short term and long term management plans, to develop eco-tourism, to ensure security for tourist, to develop infra-structure for tourism including road construction, guest houses with local food supply, to create the sources of fresh water both for human and wildlife, to create stairs in river station to make easy movement for tourist, to establish watch towers to enjoy the beauty of the bay, to introduce more tourist boats to facilitate movement, to record local knowledge from the elders about nature and adaptation and to record health care knowledge of local people, to introduce tourist police using coast guards, to create awareness programs about environment, biodiversity and wildlife, to increase literacy rate of local people, to accelerate plantation programs using local species, to provide risk allowance for the people who involved in forest management process, to increase capacity of forest and forest personals, to develop modern infrastructures for forest personals, to detect and remove invasive species, to avoid exotics in plantation programs to arrange traditional knowledge based cultural program, to create traditional medicinal knowledge sharing programs, finally to ensure land ownership and forest territory using GIS map.

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### **References.**

Ahmed, Z.U., Z.N.T., Begum, M.A., Hassan, M., Khondker, S.M.H., Kabir, M., Ahmad, A.T.A., Ahmed, A.K.A. Rahman and E.U. Haque (Eds) 2008a. *Encyclopedia of Flora and Fauna of*

- Bangladesh*, Vol. 6. Angiosperms: Dicotyledons (Acanthaceae – Asteraceae). Asiatic Society of Bangladesh, Dhaka, pp. 1-408.
- Ahmed, Z.U., M.A. Hassan, Z.N.T. Begum, M. Khondker, S.M.H. Kabir, M. Ahmad, A.T.A. Ahmed, A.K.A. Rahman and E.U. Haque, (Eds) 2008b. *Encyclopedia of Flora and Fauna of Bangladesh*, Vol. 12. Angiosperms: Monocotyledons (Orchidaceae – Zingiberaceae). Asiatic Society of Bangladesh, Dhaka, pp. 1-552.
- Ahmed, Z.U., M.A. Hassan, Z.N.T. Begum, M. Khondker, S.M.H. Kabir, M. Ahmad, A.T.A. Ahmed, A.K.A. Rahman and E.U. Haque, (Eds) 2009b. *Encyclopedia of Flora and Fauna of Bangladesh*, Vol. 7. Angiosperms: Dicotyledons (Balsaminaceae – Euphorbiaceae). Asiatic Society of Bangladesh, Dhaka, pp. 1-546.
- Ahmed, Z.U., M.A. Hassan, Z.N.T. Begum, M. Khondker, S.M.H. Kabir, M. Ahmad, A.T.A. Ahmed, A.K.A. Rahman and E.U. Haque, (Eds) 2009c. *Encyclopedia of Flora and Fauna of Bangladesh*, Vol. 8. Angiosperms: Dicotyledons (Fabaceae – Lythraceae). Asiatic Society of Bangladesh, Dhaka, pp. 1-478.
- Ahmed, Z.U., M.A. Hassan, Z.N.T. Begum, M. Khondker, S.M.H. Kabir, M. Ahmad and A.T.A. Ahmed, (Eds) 2009d. *Encyclopedia of Flora and Fauna of Bangladesh*, Vol. 9. Angiosperms: Dicotyledons (Magnoliaceae – Punicaceae). Asiatic Society of Bangladesh, Dhaka, pp. 1-488.
- Ahmed, Z.U., M.A. Hassan, Z.N.T. Begum, M. Khondker, S.M.H. Kabir, M. Ahmad and A.T.A. Ahmed, (Eds) 2009e. *Encyclopedia of Flora and Fauna of Bangladesh*, Vol. 10. Angiosperms: Dicotyledons (Ranunculaceae – Zygophyllaceae). Asiatic Society of Bangladesh, Dhaka, pp. 1-580.
- Ahmed, Z.U., M. Khondker, Z.N.T. Begum, M.A. Hassan, S.M.H. Kabir, M. Ahmad, A.T.A. Ahmed and A.K.A. Rahman, (Eds) 2009a. *Encyclopedia of Flora and Fauna of Bangladesh*, Vol. 4. Algae: Charophyta-Rhodophyta (Achnanthaceae– Vaucheriaceae). Asiatic Society of Bangladesh, Dhaka, pp. 1-543.
- Akter, A. and M.I. Zuberi. 2009. Invasive alien species in northern Bangladesh: Identification, inventory and impacts. *International journal of biodiversity and conservation* 1(5): 129134.
- Alexiades, M.N. (ed.). 1996. *Selected Guidelines for Ethno botanical Research: A Field Manual*. The New York Botanical Garden, New York.
- Ara, H., B. Khan and S. N. Uddin. 2013 (eds.) *Red data book of vascular plants of Bangladesh*, Vol 2. Bangladesh National Herbarium, Dhaka, Bangladesh. 280pp.
- Balick, M. J., A. B. Anderson and M. F. da Silva. 1982. Plant taxonomy in Brazilian Amazonia: The state of systematic collection in regional herbaria. *Brittonia* 14: 463-477.
- BBS, (Bangladesh Bureau of Statistics) 2011. Monthly Statistical Bulletin, December 2011. Statistics Division, Ministry of Planning, Government of the People's Republic of Bangladesh.
- Cronquist, A. 1981. *An integrated system of classification of flowering plants*. Columbia University Press, New York, pp. 1262
- Goldsmith, F. B. and Harrison, C. M. 1976. Description and analysis of vegetation. In: Champman, S. B. (ed.). *Methods in plant ecology*. Blackwell, Oxford, pp. 85-155.
- Hossain, M.K. and M.K. Pasha. 2004. An account of the exotic flora of Bangladesh. *Journal of forestry and environment* 2: 99-115.
- Hyland, B.P.M. 1972. A technique for collecting botanical specimens in rain forest. *Flora Malesiana Bulletin*, 26: 2038-2040.
- Khan, M.S. and A.M. Huq 2001. The vascular flora of Chunati wildlife sanctuary in south Chittagong, Bangladesh. *Bangladesh J. Plant.Taxon.* 8(1): 47-64.
- Khan, M.S., M.M. Rahman and M.M. Ali (eds.) 2001. *Red Data Book of Vascular Plants of Bangladesh*. Bangladesh National Herbarium. pp. 179.

- Khan, M.S., M.M. Rahman, A.M. Huq, M.M.K. Mia, and M. A. Hassan. 1994. Assesment of biodiversity of Teknaf game reserve in Bangladesh focusing on economically and ecologically important plants species. *Bangladesh J. Plant Taxon.* **1**(1): 21-33.
- Rahman, M.O. and M.A. Hassan 1995. Angiospermic flora of Bhawal Narional Park, Gazipur, Bangladesh. *Bangladesh J. Plant Taxon.* **2**(1&2): 47-79.
- Sajib, N. H., S.B. Uddin and M.K. Pasha, 2015. Angiospermic Plant Diversity Of Sandwip Island, Chittagong, Bangladesh. *Asiat. Soc. Bangladesh, Sci.* **41**(2): 133-153.
- Siddiqui, K.U., M.A., Islam, Z.U. Ahmed, Z.N.T. Begum, M.A. Hassan, M. Khondker, M.M. Rahman, S.M.H. Kabir, M. Ahmad, A.T.A. Ahmed, A.K.A. Rahman and E.U. Haque, (Eds) 2007. *Encyclopedia of Flora and Fauna of Bangladesh*. Vol. **11**. Angiosperms: Monocotyledons (Agavaceae -Najadaceae). Asiatic Society of Bangladesh, Dhaka, pp. 1-399.
- Uddin, M.Z, M.F. Alam, A.S.M. Rahman and M.A. Hassan. 2011. Plant Biodiversity of Fashiakhali Wildlife Sanctuary, Bangladesh. Accepted for publication in First Bangladesh Forestry Congress Proceeding 2011.
- Uddin, S.B. and M.A. Rahman. 1999. Angiospermic flora of Himchari National Park, Cox's Bazar, *Bangladesh. J. Plant Taxon.* **6**(1): 31-68.
- Uddin, M.Z. and M.A. Hassan. 2010. Angiosperm diversity of Lawachara National Park (Bangladesh): a preliminary assessment. *Bangladesh J. Plant Taxon.* **17** (1): 9-22.
- Uddin, M.Z. and M.A. Hassan. 2004. Flora of Rema-Kalenga Wildlife Sanctuary. IUCN Bangladesh Country Office, Dhaka, Bangladesh, vi+120pp.
- Uddin, M.Z., M. F. Alam, M. A. Rahman and M. A. Hassan. 2013. Diversity in angiosperm flora of Teknaf Wildlife Sanctuary, Bangladesh. *Bangladesh J. Plant Taxon.* **20**(2): 145-162.
- Uddin, S.N., M.S. Khan, M.A. Hassan and M.K. Alam, 1998. An annotated checklist of angiospermic flora of Sitapahar at Kaptai in Bangladesh. *Bangladesh J. Plant Taxon.* **5**(1): 13-46.
- Uddin, M.Z., M.G. Kibria and M.A. Hassan 2015. An assessment of angiosperm plant diversity of nijhum dweep (Island). *Journal of Asiatic Society of Bangladesh Sci.*, **41**(1): 19-32.

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