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Tree Diversity of Sylhet Forest Regions in Bangladesh

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Abstract
The tree is one of the most important natural resources in Bangladesh. The tree has multipurpose uses from the ancient period to the modern ages. Trees are the dominant elements of a forest. But due to over-exploitation, the essential elements of the forest are degraded.The main aim of the study was to determine the present status of the tree species Sylhet regions in Bangladesh. A total of 266 tree species of 146 genera under 56 families were recorded in the study areas. The dominant families with respect to species number were Euphorbiaceae (11), Moraceae (10) Mimosaceae (6), Meliaceae (5), Myrtaceae (5) Caesalpiniaceae (4), Dipterocarpaceae (2), and 13 families were represented by two species and 17 families were represented by single species. The present study also indicated that a total of 13 types of fruit were found and drupe type of fruits were the dominant and their possessed were 25.49% in the study areas. The contribution of samara type of fruit was only 0.98% which was the lowest in the shorea robusta forests of Bangladesh. The finding of the present investigation study will expand in the regeneration of tree species in this degraded forests ecosystem and in the protection, conservation and sustainable management of the forest Flora of Bangladesh.

Keywords: *Tree species, present status,family, genera, fruits,*

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I. INTRODUCTION

Sylhet forest regions are consisted of Sylhet, Sunamgonj, Moulvibazar and Habigonj. There about 747 square km of forest lands comprising of 207, 106, 294 and 140 km in the above districts. Hooker (1904) divided the British India into three botanical areas such as: Himalayan, eastern and western. The whole Bangladesh including Sylhet falls into eastern moist region and hills are covered with evergreen trees with and admixture of deciduous species.Vegetation of Sylhet regions are very important for the richness of tree species of Bangladesh. Many explorations were completed in different regions of Bangladesh such as; List of the Plants of Chittagong Collectorate and Hill Tracts by Heinig (1925), Flora of Cox's Bazar by Sinclair (1955), Flora of Sundarbans by Prain (1903b), Flora of Chakoria Sundarbans by Cowan (1926), Angiospermic Flora of Chittagong Hill Tracts by Khan and Banu (1972), A taxonomic report on the Angiospermic Flora of Teknaf and St. Martin's Island by Khan and Afza (1968). Ismail and Mia (1973) gave a brief account of the ecology of the sal forests. Hooker (1872-1897) collected some plant species from these regions. Kanjilal reported (1934-1940) Flora of Assam. In the distribution notes of species cited in the works by Hooker (1872-1897), Prain (1903a) and Brandis (1906), information is available on the occurrence of some species from these forest areas. A check list of tree species in the Sylhet forests areas is made to impossible due to lack of the information of the total tree species.

The main objective of the study is to make a list of tree species with taxonomic description and phonological criteria. Therefore, the study has been attempted to determine timber diversity and conservation status of the tree species in Sylhet forest areas of Bangladesh.

II. MATERIALS AND METHODS

The study was based on field data collection and laboratory investigation from January 2019 to December 2020.The taxonomic identification of the collected specimens were confirmed by comparing with the authentically identified herbarium specimens of Bangladesh Forest Research Institute Herbarium and Bangladesh National Herbarium. Voucher specimens were preserved in the Bangladesh National Herbarium. In some cases, standard literatures were followed for identification of species. Such as Prain (1903b), Heinig (1925), Siddiqui (2007), Ahmed *et al.* (2008-2009), Pasha and Uddin (2013) were consulted for the identification of the specimens. On the other hand, world website 'Catalogue of Life' (2012) and "The Plant List" (2010) are considered for identification of some critical specimens. Some expert opinions were also followed to identify the specimens.

Study areas

Sylhet forests regions are distributed in the comparatively eastern and northern areas of the country, most occurring in Sunamgonj, Sylhet, Moulvibazar and Habigonj. The forest areas in the four districts lie between 24.00°to 25.12° north latitude and 90.55° to 92.30°east longitude. Most of the forests areas are situated on several low hills. Some parts of these regions are distributed in fresh water swamp forests which are lying on the foot of the hill.

Soils

The soil of the hills is sandy loam mixed with gravel and often contains ferruginous matter. The soil of the plains varies from clay- loam to sandy-loam. There are shales appearing on the surface in Jaflong areas (Anno. 1986).

Climatic conditions

Rainfall varies from 2290from 5840 mm and average rainfall is 6,600 mm. Maximum and minimum temperature is 31.40°C to 12.90°C.Humidity is about 69-955% and wind speed is 6 km per hour (Anno.).

Data analysis:

Microsoft Excel program was used to process all collected data and preparing tables, figures, and graphs. SPSS (Statistical Package for Social Science) software version 21.00 was used to estimate the descriptive of the statistical data.

III. RESULTS AND DISCUSSION

A total of 266 tree species of 146 genera under 56 families were identified from the present study area. The species were arranged alphabetically following their scientific name, family name, flowering and fruiting times and type of fruits (Table-1).

Table 1: A check list of the tree species of Sylhet regions.

1	*Acacia auriculiformis* A.Cunn.	Mimosaceae	6-7	10-12	Legume
2	*Acacia mangium* Willd.	Mimosaceae	4-5	10-12	Legume
3	*Acrocarpus fraxinifolius* Wall.	Caesalpiniaceae	2-3	7-8	Pod
4	*Actinodaphne angustifolia* Nees.	Lauraceae	9-11	12-1	Globose
5	*Adenanthera pavonina* L.	Mimosaceae	3-5	12-1	Pod
6	*Adina cordifolia* Roxb.	Rubiaceae	4-7	8-2	Globose
7	*Aegle marmelos* L.	Rutaceae	3-5	1-3	Woody
8	*Aglaia edulis* Grey.	Meliaceae	3-4	8-9	Berry
9	*Alangium barbata* R.Br.	Alangiaceae	12-5	12-5	D
10	*Alangium begoniaefolia* Roxb.	Alangiaceae	3-6	6-9	D
11	*Albizia chinensis* (Osb.) Merr.	Mimosaceae	5-8	12-2	Pod
12	*Albizia lebbeck* L.	Mimosaceae	5-6	12-2	Pod
13	*Albizia lucidor* Roxb.	Mimosaceae	3-5	12-2	Pod
14	*Albizia odoratissima* L .f.	Mimosaceae	5-6	12-1	Pod
15	*Albizia procera* Roxb.	Mimosaceae	5-7	12-2	Pod
16	*Albizia richardiana* Voigt.	Mimosaceae	5-8	12-1	Pod
17	*Alphonsea lutea* Hook. f.	Annonaceae	3-4	7-9	E
18	*Alphonsea ventricosa* Hook. f.	Annonaceae	3-4	7-9	E
19	*Alstonia scholaris* (L.) R.Br.	Apocynaceae	11-2	2-5	Oblong
20	*Annona reticulata* L.	Annonaceae	7-8	11-3	Oblong
21	*Annona squamosa* L.	Annonaceae	3-5	8-11	Globose
22	*Anogiessus serica* Brandis	Combretaceae	1-3	11-12	Oblong
23	*Aphanamixis polystachya* Roxb.	Meliaceae	10-11	2-3	Capsule
24	*Aphananthe cuspida* Bl.	Ulmaceae	5-6	12-2	Drupe
25	*Aporusa dioica* Roxb.	Euphorbiaceae	12-1	4-5	Oblong
26	*Aporusa wallichii* Hook. f.	Euphorbiaceae	2-3	5-6	Globose
27	*Aquilaria agallocha* Roxb.	Thymelaeaceae	5-6	8-9	Capsule
28	*Artocarpus chaplasha* Roxb.	Moraceae	3-4	5-7	Syncarp
29	*Artocarpus heterophyllus* Lamk.	Moraceae	11-3	4-7	Syncarp
30	*Artocarpus lacucha* Buch-Ham.	Moraceae	2-5	5-8	Syncarp
31	*Averrhoa carambola* L.	Oxalidaceae	8-9	11-1	Oblong
32	*Azadirachta indica* A. Juss	Meliaceae	3-4	7-8	Drupe
33	*Baccaurea ramiflora*Lour.	Euphorbiaceae	4-5	5-7	Capsule
34	*Barringtonia acutangula* L.	Lecythidaceae	3-6	10-2	Oblong
35	*Bauhinia malabarica* Roxb.	Caesalpiniaceae	8-10	1-5	Pod
36	*Bauhinia variegata* L.	Caesalpiniaceae	2-4	5-7	Pod
37	*Beilschiedia assamica* Meissn.	Lauraceae	10-12	2-3	Ovoid
38	*Bhesa robusta* Roxb.	Celastraceae	9-10	1-3	Capsule

39	*Bischofia javanica* Bl.	Euphorbiaceae	3-5	12-1	Elliptic
40	*Bixa orellana* L.	Bixaceae	7-10	10-12	Capsule
41	*Bombax ceiba* L.	Bombacaceae	1-3	4-5	Capsule
42	*Bombax insigne* Wall.	Bombacaceae	12-1	7-8	Capsule
43	*Bridelia assamica* Hook. f.	Euphorbiaceae	2-3	5-6	Drupe
44	*Bridelia retusa* L.	Euphorbiaceae	3-5	12-12	Drupe
45	*Bridelia squamosa* Muell.-Arg.	Euphorbiaceae	5-6	8-10	Drupe
46	*Butea monosperma* Lamk.	Fabaceae	3-4	6-7	Pod
47	*Callicarpa arborea* Roxb.	Verbenaceae	5-6	8-10	Drupe
48	*Callicarpa macrophylla* Vahl.	Verbenaceae	12-12	12-12	Oblong
49	*Calophyllum polyanthum* Wall	Clusiaceae	2-5	12-3	Globose
50	*Camellia sinensis* (L.) O. Kuntze.	Theaceae	12-3	9-12	Capsule
51	*Canarium bengalense* Roxb.	Burseraceae	5-7	11-1	Drupe
52	*Canarium pinnata* Roxb.	Burseraceae	3-4	5-12	Drupe
53	*Canarium resiniferum* Brace.	Burseraceae	6-7	12-1	Drupe
54	*Canthaium glabrum* Bl.	Rubiaceae	7-10	1-3	Drupe
55	*Careya arborea* Roxb.	Lecythidaceae	2-3	6-8	Berry
56	*Cassia fistula* L.	Caesalpiniaceae	3-6	12-1	Pod
57	*Castanopsis hystrix* A.DC.	Fagaceae	12-3	12-3	Spike
58	*Castanopsis Indica* DC.	Fagaceae	2-4	10-12	Nut
59	*Castanopsis tribuloides* DC	Fagaceae	9-11	12-2	Nut
60	*Celtis cinnamomea* Lindl.	Ulmaceae	12-1	4-7	Drupe
61	*Celtis tetrandra* Roxb.	Ulmaceae	2-3	10-11	Drupe
62	*Chukrasia tabularis* A. Juss.	Meliaceae	5-7	12-3	Drupe
63	*Cinnammum tamala* Nees.	Lauraceae	2-3	7-8	Drupe
64	*Cinnamomum cecidodaphne* Meissn.	Lauraceae	2-3	10-11	Oblong
65	*Cinnamomum obtusifoliam* Nees.	Lauraceae	1-3	6-7	Globose
66	*Citrus grandis* L.	Rutaceae	3-4	6-8	Berry
67	*Citrus hystrix* DC.	Rutaceae	3-4	6-8	Berry
68	*Commiphora roxburghii* Arn.	Burseraceae	3-4	7-8	Elliptic
69	*Cordia dichotoma* Frost.	Boraginaceae	3-4	6-8	Elliptic
70	*Cordia fragrantissima* Kurz.	Boraginaceae	11-12	3-4	Elliptic
71	*Crateva magna* Lour.	Capparaceae	3-4	7-9	Berry.
72	*Cresentia cujeti* L.	Bignoniaceae	8-9	12-1	Globose
73	Croton chlorocalyx Wall.	Euphorbiaceae	2-3	6-9	Capsule
74	*Croton oblongifollius* Roxb.	Euphorbiaceae	1-2	5-6	Capsule
75	*Dalbergia assamica* Benth.	Fabaceae	4-5	12-1	Pod
76	*Derris robusta* Benth.	Fabaceae	4-5	11-12	Pod
77	*Dichapetalum gelonoides* Roxb.	Dichapetalaceae	5-6	11-12	Drupe
78	*Dillenia indica* L.	Dilleniaceae	6-8	2-4	Globose
79	*Dillenia pentagyna* Roxb.	Dilleniaceae	3-5	5-7	Globose
80	*Dillenia scabrella* Roxb.	Dilleniaceae	3-5	5-7	Globose
81	*Diospyros lancaeifoia* Roxb.	Ebenaceae	4-5	12-2	Berry
82	*Diospyros nigricans* Wall.	Ebenaceae	4-5	10-11	Berry
83	*Diospyros pilosula* Wall.	Ebenaceae	1-3	5-6	Berry
84	*Diospyros racemosa* Roxb.	Ebenaceae	4-5	12-2	Berry
85	*Diospyros stricta* Roxb.	Ebenaceae	10-11	1-3	Berry
86	*Dipterocarpus alatus* Roxb.	Dipterocarpaceae	2-3	5-6	Nut
87	*Dipterocarpus costatus* Gaertn.	Dipterocarpaceae	3-4	5-6	Nut
88	*Dipterocarpus gracilis* Blume.	Dipterocarpaceae	3-4	5-6	Nut
89	*Dipterocarpus turbinatus* Gaertn.	Dipterocarpaceae	3—4	5-6	Nut
90	*Drimycarpus racemosus* Hook. f.	Anacardiaceae	9-11	11-4	D
91	*Duabanga grandiflora* Roxb.	Sonneratiaceae	2-4	5-6	Capsule
92	*Dysoxylum binecteriferum*	Meliaceae	4-5	12-2	Drupe
93	*Dysoxylum grande* Hiern.	Meliaceae	5-7	12-1	Drupe
94	*Dysoxylum haniltonii* Hiern.	Meliaceae	11-12	10-2	Drupe
95	*Dysoxylum procerum* Hiern.	Meliaceae	12-1	5-7	Drupe
96	*Ehretia serrata* Roxb.	Boraginaceae	3-4	11-1	Drupe
97	*Elaeocarpus acuminatus* Wall.	Elaeocarpaceae	5-6	7-9	Drupe
98	*Elaeocarpus floribundus* Bl.	Elaeocarpaceae	5-8	11-12	Drupe
99	*Elaeocarpus lancaeifolia* Roxb.	Elaeocarpaceae	12-2	3-4	Drupe
100	*Elaeocarpus petiolatus* Jack.	Elaeocarpaceae	12-1	2-3	Drupe
101	*Elaeocarpus prunifolius* Wall.	Elaeocarpaceae	1-2	9-10	Drupe
102	*Elaeocarpus robustus* Roxb.	Elaeocarpaceae	4-5	8-9	Drupe
103	*Elaeocarpus rogusus* Roxb.	Elaeocarpaceae	1-4	9-10	Drupe
104	*Elaeocarpus sphaericus* Gaertn.	Elaeocarpaceae	5-6	11-12	Drupe
105	*Elaeocarpus varunna* Buch.-Ham.	Elaeocarpaceae	1-3	7-9	Drupe
106	*Endiandra firma* Nees.	Lauraceae	10-11	2-3	Ovoid
107	*Endospermum oppositifolia* Griff.	Euphorbiaceae	3-4	12-1	Capsule
108	*Engelhardtia spicata* Lesch.	Juglandaceae	11-3	1-3	Globose

109	*Erythrina fusca* Lour.	Fabaceae	1-3	4-6	Pod
110	*Erythrina stricta* Roxb.	Fabaceae	1-3	3-5	Pod
111	*Eucalyptus cameldolensis* Dehnn.	Myrtaceae			Berry
112	*Eucalyptus tereticornis*	Myrtaceae			Berry
113	*Eugenia saligna* Miq.	Myrtaceae	3-5	7-9	Berry
114	*Eugenia bifaria* Wall.	Myrtaceae	2-3	6-7	Berry
115	*Eugenia khasiana* Duthie.	Myrtaceae	10-11	3-4	Berry
116	*Eugenia Macrocarpa* Roxb.	Myrtaceae	3-4	8-9	Berry
117	*Eugenia Mangifolia* Wall.	Myrtaceae	3-4	7-9	Berry
118	*Eugenia ramosissima* Wall.	Myrtaceae	3-4	7-9	Berry
119	*Eugenia wallichii* Wt.	Myrtaceae	12-2	4-5	Berry
120	*Eunymus bulletus*Wall.	Celastraceae	2-5	6-12	Capsule
121	*Ficus benghalensis* L.	Moraceae	4-7	90-10	Syncarp
122	*Ficus benjamina* L.	Moraceae	2-3	8-9	Syncarp
123	*Ficus geniculata* Kurz.	Moraceae	9-11	7-8	Syncarp
124	*Ficus hirta* Vahl.	Moraceae	12-1	12-1	Syncarp
125	*Ficus nervosa* Heyne.	Moraceae	10-12	5-7	Syncarp
126	*Ficus racemosa* L.	Moraceae	4-7	10-12	Syncarp
127	*Ficus* religiosa L.	Moraceae	12-1	12-1	Syncarp
128	*Ficus rumphii* Bl.	Moraceae	12-1	12-1	Syncarp
129	*Garcinia affinis* Wall.	Clusiaceae	00	00	Globose
130	*Garcinia cowa* Roxb.	Clusiaceae	3-4	6-8	Globose
131	*Garcinia paniculata* Roxb.	Clusiaceae	9-4	12-2	Globose
132	*Garuda pinnata* Roxb.	Burseraceae	3-4	5-12	Drupe
133	*Gliricidia sepium* Jacq.	Fabaceae	2-3	5-6	Pod
134	*Glochidion arborescens* Bl.	Euphorbiaceae	12-2	4-5	Capsule
135	*Glochidion sphaerogynum* Kurz.	Euphorbiaceae	12-1	4-5	Capsule
136	*Gmelina arborea* L.	Verbenaceae	2-3	5-7	Drupe
137	*Grewia glabra* Bl.	Tiliaceae	9-10	11-12	Drupe
138	*Grewia microcos* L.	Tiliaceae	4-6	11-1	Drupe
139	*Haplophragma adenophyllum* Wall.	Bignoniaceae	1-3	11-12	Capsule
140	*Heleia excelsa* Bl.	Proteaceae	4-6	9-1	Elliptic
141	*Heteropanax fragrans* D. Don.	Araliaceae	3-4	5-6	Elliptic
142	*Holarrhena pubescens* Buch.-Ham.	Apocynaceae	2-4	10-12	Follicle
143	*Holigarna caustica* Dennst.	Anacardiaceae	12-1	5-6	D
144	*Homalium bhamoense* Cubit.	Flacourtiaceae	3-4	6-7	Oval
145	*Homalium schlichii* Kurz.	Flacourtiaceae	3-5	8-9	Oblong
146	*Hopea odorata* Roxb.	Dipterocarpaceae	2-3	5-7	Nut
147	*Hydnocarpus kurzii* Warb.	Flacourtiaceae	9-11	12-2	Oblong
148	*Illex sulcata* Wall.	Aquifoliaceae	2-4	4-6	D
149	*Indigofera teysmanni*	Fabaceae	4-5	12-3	Pod
150	*Kayea floribuda* Wall	Clusiaceae	1-3	4-5	Drupe
151	*Lagerstroemia parviflora* Roxb.	Lythraceae	4-5	11-12	Capsule
152	*Lagerstroemia speciosa* L.	Lythraceae	6-8	12-2	Capsule
153	*Lannea coromandelica* Houtt.	Anacardiaceae	3-4	4-6	D
154	*Leea imbraculifera* Clarke.	Leeaceae	7-11	12-2	Globose
155	*Litsea glutinosa* Lour.	Lauraceae	4-7	12-2	Oblong
156	*Litsea nitida* Roxb.	Lauraceae	9-11	1-4	Elliptic
157	*Litsea panamonja* Buch.-ham	Lauraceae	3-4	4-5	Globose
158	*Litsea thomsonii* Meissn	Lauraceae	7-9	4-5	Pedicel
159	*Lophopetalum wightianum* Arns.	Celastraceae	2-4	6-8	Oblong
160	*Macaranga denticulata* Bl.	Euphorbiaceae	2-3	5-7	Capsule
161	*Macaranga indica* Wt.	Euphorbiaceae	3-4	12-1	Capsule
162	*Macropanax oreiphilum* Miq.	Araliaceae	12-1	3-4	Elliptic
163	*Macropanax undulatum* Seem.	Araliaceae	2-3	10-9	Elliptic
164	*Mallotus albus* Muell.-Arg.	Euphorbiaceae	12-2	5-6	Capsule
165	*Mallotus philippensis* Lam. Muell.	Euphorbiaceae	8-11	2-5	Capsule
166	*Mallotus tetracoccus* Roxb.	Euphorbiaceae	12-1	12-1	Globose
167	*Mangifera indica* L.	Ancardiaceae	2-3	4-6	D
168	*Mangifera sylvatica* Roxb.	Anacardiaceae	9-10	1-3	D
169	*Margaritaria indica* Dalz.	Euphorbiaceae	4-5	12-2	Capsule
170	*Mesua ferrea* L.	Clusiaceae	4-5	8-10	Ovoid
171	*Michelia champaca* L.	Magnoliaceae	2-4	2-4	Woody
172	*Michelia manii* King	Magnoliaceae	11-12	4-5	Woody
173	*Michelia montana* Bl.	Magnoliaceae	7-9	8-9	Woody
174	*Michelia oblonga* Wall.	Magnoliaceae	2-3	8-10	Woody
175	*Microtropis discolor* Wall.	Celastraceae	1-12	1-12	Elliptic
176	*Miliusa velutina* Hook. f.	Annonaceae	10-1	3-4	Oblong
177	*Mimusops elengi* Roxb.	Sapotaceae	4-6	12-2	Berry

178	*Moringa olifera* Lamk.	Moringaceae	1-3	5-7	Capsule
179	*Morus laevigata* Wall.	Moraceae	2-3	4-5	Syncarp
180	*Myristica angustifolia* Roxb.	Myristicaceae	11-12	1-4	Elliptic
181	*Myristica glabra* Bl.	Myristicaceae	4-5	9-10	Elliptic
182	*Myristica kingii* Hook. f	Myristicaceae	5-7	2-4	Elliptic
183	*Myristica linifolia* Roxb.	Myristicaceae	11-12	5-6	Elliptic
184	*Neolamarckia cadamba* Roxb.	Rubiaceae	12-2	5-10	Elliptic
185	*Oroxylum indicum* L.	Bignoniaceae	6-8	12-2	Capsule
186	*Ostodes paniculata* Bl.	Euphorbiaceae	3-4	6-7	Capsule
187	*Pajanelia longifolia* Willd.	Bignoniaceae	12-2	3-5	Capsule
188	*Palaquium polyanthum* Benth.	Sapotaceae	3-5	5-6	Berry
189	*Paraserianthes falcataria* L.	Mimosaceae	4-6	7-9	Pod
190	*Persea bombycina* King	Lauraceae	12-2	3-4	Elliptic
191	*Persea owdenii* Parker.	Lauraceae	3-5	6-7	Panicle
192	*Phyllanthus emblica* Gaertn.	Euphorbiaceae	3-5	10-12	Drupe
193	*Polyalthia jenkinsii* Hook. f.	Annonaceae	8-10	12-6	Oblong
194	*Polyalthia simiarum* Benth.	Annonaceae	6-11	5-8	Oblong
195	*Premna begalensis* Clarke.	Verbenaceae	5-7	8-11	Oblong
196	*Protium serratum* Wall.	Burseraceae	3-4	4-6	Drupe
197	*Pterospermum acerifolium* L.	Sterculiaceae	4-6	12-3	Capsule
198	*Pterygota alata* Roxb.	Sterculiaceae	2-4	11-3	Oblong
199	*Quercus fenestrata* Roxb.	Fagaceae	9-11	12-2	Spike
200	*Quercus lancaeifolia* Roxb.	Fagaceae	8-12	12-1	Oblique
201	*Quercus lappacea* Roxb.	Fagaceae	2-3	7-8	Spike
202	*Quercus semiserrata* Roxb.	Fagaceae	11-3	7-9	Spike
203	*Quercus spicata* Smith.	Fagaceae	4-5	8-11	Capsule
204	*Quercus thomsonii* Miq.	Fagaceae	6-8	7-9	Spike
205	*Rhus succdanea* L.	Anacardiaceae	3-4	1-5	D
206	*Salix tetrasperma* Roxb.	Salicaceae	11-1	2-3	Capsule
207	*Samanea saman* (Jacq.) Merr.	Mimosaceae	2-6	3-4	Pod
208	*Sapindus mukrossi* Gaertn.	Sapindaceae	5-6	10-1	Globose
209	*Sapium baccatum* Roxb.	Euphorbiaceae	3-6	8-11	Berry
210	*Sapium eugeniaefolium* Buch-Ham.	Euphorbiaceae	5-6	10-1	Capsule
211	*Sarcosperma arboretum* Benth.	Sapotaceae	12-2	6-7	Berry
212	*Schima wallichii* Choisy.	Theaceae	5-6	12-2	Capsule
213	*Semecarpus ancardium* L. f.	Anacardiaceae	7-9	12-3	D
214	*Semecarpus prainii* King	Anacardiaceae	3-4	5-6	D
215	*Shorea robusta* Roxb.	Dipterocarpaceae	2-4	5-6	Nut
216	*Sidaroxylon grandifolium* Wall.	Sapotaceae	4-5	12-2	Berry
217	*Spondias pinnata* L. f	Anacardiaceae	3-5	11-12	Drupe
218	*Sterculia guttata* Roxb.	Sterculiaceae	4-5	8-9	Follicle
219	*Sterculia parviflora Roxb.*	Sterculiaceae	2-3	8-9	Capsule
220	*Sterculia villosa Roxb.*	Sterculiaceae	3-4	4-6	Follicle
221	*Stereospermum personatum* Hasak.	Bignoniaceae	4-6	12-1	Capsule
222	*Streblus asper* Lour.	Moraceae	2-4	5-7	Berry
223	*Suregada multiflora* Juss.	Euphorbiaceae	3-4	4-5	Capsule
224	*Symplocos grandiflora* Wall.	Styracaceae	11-12	2-3	Drupe
225	*Syzygium cumini* Skeels.	Myrtaceae	4-5	6-7	Berry
226	*Syzygium fruticosum* (Roxb.) DC.	Myrtaceae	3-4	5-6	Berry
227	*Syzygium grande* Wt.	Myrtaceae	12-2	4-5	Berry
228	*Syzygium inophyllum* (Roxb.) DC.	Myrtaceae	12-2	4-5	Berry
229	*Syzygium jambos* L.	Myrtaceae	2-4	6-7	Berry
230	*Syzygium oblatum* (Roxb.) Wall	Myrtaceae	11-1	4-5	Berry
231	*Syzygium operculatum* Roxb.	Myrtaceae	12-1	4-5	Berry
232	*Syzygium syzygiodes* Miq.	Myrtaceae	11-2	3-4	Berry
233	*Syzygium tetragonum* Wall.	Myrtaceae	11-1	1-3	Berry
234	*Tamarindus. indica* L	Caesalpiniaceae	2-4	12-3	Pod
235	*Tectona grandis* L.	Verbenaceae	7-9	12-1	Drupe
236	*Terminalia bellirica* Gaertn.	Combretaceae	12-2	12-2	Drupe
237	*Terminalia catappa* L.	Combretaceae	3-4	5-8	Elliptic
238	*Terminalia chebula* Gaertn.	Combretaceae	4-6	2-3	Drupe
239	*Terminalia citrina* Roxb.	Combretaceae	6-7	1-2	Drupe
240	*Terminalia myriocarpa* Muell.	Combretaceae	10-11	2-5	Drupe
241	*Terminalia tomentosa* Wight.	Combretaceae	4-6	2-3	Drupe
242	*Tetrameles nudiflora* R.Br.	Datiscaceae	2-3	7-9	Capsule

243	*Toona ciliata* Roem.	Meliaceae	1-3	5-7	Capsule
244	*Trema orientalis* (L.) Bl.	Ulmaceae	1-4	6-8	Drupe
245	*Trema tomentosa* Roxb.	Ulmaceae	4-7	9-11	Drupe
246	*Trevesia palmata* Vis.	Araliaceae	2-4	5-6	Oblong
247	*Trewia nudiflora* L.	Euphorbiaceae	1-3	7-8	Globose
248	*Turpinia pomifera* (Roxb.)DC.	Staphyleaceae	2-3	4-5	Nut
249	*Vatica lancaeifolia* Roxb.	Dipterocarpaceae	4-5	5-7	Nut
250	*Vitex altissima* L.	Verbenaceae	4-6	7-9	Drupe
251	*Vitex canescens Kurz*	Verbenaceae	4-6	6-10	Drupe
252	*Vitex glabrata Br.*	Verbenaceae	4-5	10-12	Drupe
253	*Vitex negundo* L.	Verbenaceae	4-8	12-2	Drupe
254	*Vitex peduncularis* Wall.	Verbenaceae	4-6	7-9	Drupe
255	*Vitex pinnata* L.	Verbenaceae	5-6	8-9	Drupe
256	*Vitex quinata* Lour.	Verbenaceae	5-7	12-2	Drupe
257	*Wrightia coccinea* Sims.	Apocynaceae	4-5	7-8	Follicle
258	*Wrightia tomentosa* Roem.	Apocynaceae	5-6	1-2	Follicle
259	*Xylia kerrii* Craib.	Mimosaceae	3-4	12-2	Pod
260	*Zanthoxylum budrunga Wall.*	Rutaceae	3-4	8-9	Oblong
261	*Zanthoxylum hamiltonia* Wall.	Rutaceae	3-4	5-6	Oblong
262	*Zanthoxylum rhetsa* (Roxb.)DC.	Rutaceae	3-4	11-12	Oblong
263	*Zerospermum noronhianum* Bl.	Sapindaceae	4-5	11-3	Elliptic
264	*Ziziphus mauritiana* Lamk.	Rhamnaceae	9-11	12-3	Drupe
265	*Ziziphus oenoplia* L.	Rhamnaceae	9-10	11-1	Drupe
266	*Ziziphus rugosa* Lamk.	Rhamnaceae	3-4	5-7	Drupe

Legend: Fl. =flowering times, Fr. =fruiting times, Fr. T= fruit types.

Flowering and fruiting times were recorded during this study period and large variations were found species to species (Table-1).The present study also indicated thatthe spring and summer seasons were suitable for appearing of flowering and fruiting in the study area.

The present study revealed that a total of 263 forests species were recorded from the forests of Sylhet regions. The species richness of the Sylhet forests regions were high compared to 65 tree species reported from the Kaptai National Park (Rahman *et al*., 2019); 85 tree species reported from Ramu reserved forest of Cox's Bazar (Hossain *et al.*, 2004); 92 tree species from the Chunati Wildlife sanctuary(Rahman and Hossain *et al*., 2002); 102 tree species from Boroitoli forest (Rahman *et al*., 2004); 62 tree species from the Tankawati Natural forest (Motaleb and Hossain, 2011); 77 tree species reported from the Dudhpukuria Natural forest (Hossain *et al*., 2012). But it was quite lower in comparison to the 153 tree species reported from the tropical forests of Eastern Ghats, India (Reddy *et al*., 2011); 162 tree species from the primary forests of Garo Hills India (Kumar *et al.*, 2006).

A total of 146 genus were recorded from the study areas.The highest number of genus were found in Euphorbiaceae family (15), Anacardiaceae (7), Lauraceae (6), Mimosaceae (6), Fabaceae (6), Bignoniaceae (5), Meliaceae (5),Verbenaceae (5), Annonaceae, Burseraceae,Dipterocarpaceae, Clusiaceae, Celastraceae, Caesalpiniaceae, Moraceae and Sapotaceae each family contained 4 genus respectively. Araliaceae, Apocynaceae, Rubiaceae, Rutaceae, Myrtaceae and Ulmaceae each family contained 3 genus respectively. Theaceae, Combretaceae, Fagaceae, Flacourtiaceae, Lecythidaceae, Sapindaceae and Sterculiaceae each family contained 2 genus respectively. There were 28 families which contained only single genus (Table-2).

Table-2: Number of family and their genus number

Sl. No.	Family	No. of Genus	Sl. No.	Family	No. of Genus	Sl. No.	Family	No. of Genus
1	Alangiaceae	1	20	Dilleniaceae	1	39	Myrtaceae	3
2	Anacardiaceae	7	21	Dipterocarpaceae	4	40	Oxalidaceae	1
3	Annonaceae	4	22	Ebenaceae	1	41	Proteaceae	1
4	Apocynaceae	3	23	Elaeocarpaceae	1	42	Rhamnaceae	1
5	Aquifoliaceae	1	24	Euphorbiaceae	15	43	Rubiaceae	3
6	Araliaceae	3	25	Fabaceae	6	44	Rutaceae	3
7	Bignoniaceae	5	26	Fagaceae	2	45	Salicaceae	1
8	Bixaceae	1	27	Flacourtiaceae	2	46	Sapindaceae	2
9	Boraginaceae	1	28	Juglandaceae	1	47	Sapotaceae	4
10	Bombacaceae	1	29	Lauraceae	6	48	Sonneratiaceae	1
11	Boraginaceae	1	30	Lecythidaceae	2	49	Staphyleaceae	1
12	Burseraceae	4	31	Leeaceae	1	50	Sterculiaceae	2
13	Caesalpiniaceae	4	32	Lythraceae	1	51	Styracaceae	1
14	Capparaceae	1	33	Magnoliaceae	1	52	Theaceae	2
15	Celastraceae	4	34	Meliaceae	5	53	Thymelaeaceae	1
16	Clusiaceae	4	35	Mimosaceae	6	54	Tiliaceae	1

17	Combretaceae	2	36	Moraceae	4	55	Ulmaceae	3
18	Datiscaceae	1	37	Moringaceae	1	56	Verbenaceae	5
19	Dichapetalaceae	1	38	Myristicaceae	1			146

Euphorbiaceae family possessed the highest percent of species (10.80%) followed by Moraceae (9.80%), Mimosaceae (6.86%), Myrtaceae (4.90%), Meliaceae (4.90%), Fabaceae (4.90%), Lauraceae (4.90%), Caesalpiniaceae (3.92%), Verbenaceae (3.92%). There were twelve families (Group-2) which contained 2 species (27.50%) and 14 families (Group-1) which contained single species (11.80%) respectively (Figure-2).

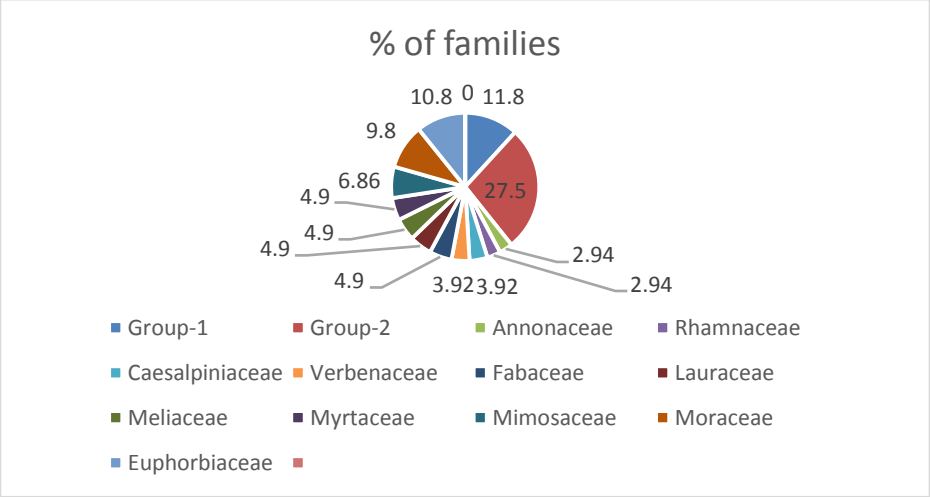

Figure 1: Percentage of the recorded plants families in the study area.

The present study also observed that a total of 13 types of fruits were presented in the study area. Among them, drupe type of fruit was the highest (25.49%) dominant in the *shorea robust* forest of Bangladesh (Table-2).

Table 2: Types of fruit and their percentages

Sl.No	Fruit type	No.	%	Sl.No	Fruit type	Sl.No.	%
1	Achene	2	1.96	8	Nut	2	1.96
2	Berry	11	10.8	9	Oblong	4	3.92
3	Capsule	14	13.7	10	Pod	16	15.7
4	Drupe	26	25.5	11	Pedicellate	2	1.96
5	Ellipsoid	2	1.96	12	Samara	1	0.98
6	Follicle	4	3.92	13	Syncarp	3	2.94
7	Globose	15	14.7		Total	102	100

Pod, Globose, capsule and berry types of fruit were 15.70%, 14.70%, 13.70% and 10.80% respectively. Oblong, follicle syncarp, achene, ellipsoid, pedicellate and nut comprised of 3.92% and 3.92%, 2.94 % 1.96 %, 1.96 %, 1.96 % and 1.96% respectively. Samara was the lowest type of fruit and presented by single species.

IV. Conclusion

Trees species diversity is the most important natural resources. Due to anthropogenic pressure, valuable tree species are destroying day by day at an alarming rate and barren lands are encroached by multiple purposes. The following problems are main issues for degradation of *shorea robusta* forests areas such as; industrialization, urbanization, overgrazing, degradation of forests resources due to illegal logging, forest fire, excessive use of the trees in the brick fields as fuel and pressure of increasing population and biotic interferences. As a result, conservation and proper management of tree species should be established for sustainable development and ecological balance.

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