

FLORISTIC COMPOSITION OF LAWACHARA FOREST IN BANGLADESH

J.C. MALAKER, M.M. RAHMAN, A.K.M. AZAD-UD-DOULA PRODHAN, S.K. MALAKER AND M.A.H. KHAN

Department of Crop Botany, Bangladesh Agricultural University, Mymensingh-2202, Bangladesh.

Corresponding author & address: J.C. Malaker, E-mail: jagot_mala@yahoo.com

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ABSTRACT

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An annotated checklist of the angiosperm genetic resources of Lawachara forest in Bangladesh was prepared to provide information on the plant diversity it contained. A total of 159 plant species was recorded under 123 genera and 60 families in Lawachara forest. As regards to their growth habits, some 78 species were found as trees, 14 species as shrubs, 42 species as herbs and 25 species as climbers. As regards to the diversity of species and genera, about 123 genera were recorded of which, *Ficus* and *Syzygium* were the largest genera having 7 species each. *Terminalia* and *Dioscorea* were the second largest genera with 4 species each followed by *Artocarpus*, *Calamus*, *Piper*, *Alpinia* and *Curcuma* having 3 species each. A total of 106 genera was recorded with a single species each. As regards to family composition, about 60 families were recorded in the list of which Leguminosae was the largest family having 12 genera with 13 species. Compositae was the second largest family containing 7 genera with 7 species each. Euphorbiaceae and Gramineae were the third largest family containing 6 genera and 6 species each followed by Anacardiaceae, Apocynaceae and Rubiaceae with 5 genera and 5 species while verbanaceae containing 5 genera with 6 species. Combretaceae, Cyperaceae, Dioscoreaceae, Guttiferae, Musaceae, Myrtaceae and Piperaceae were represented by single genus with multiple species each, and 30 families with only single species each.

Key words: floristic composition, Lawachara forest and uses

INTRODUCTION

The Lawachara forest is a part of the West Bhanugach Reserved Forest and located in Kamalgonj Union of Kamalgonj Upazila in the district of Moulivibazar. The park is under the jurisdiction of Moulivibazar Forest Range under Sylhet Forest Division. There about 18 villages, of which two (Lawachara pung and Magurchara pung) are located inside and the rest are located outside of forest area. The people of Lawachara forest are very diverse. There are Tripura people who are Hindu, Khasia people who are Christian, and many Bengali people, migrants from other areas in Bangladesh, and also native born who are mostly Muslim. There are a number of indigenous people who work on the surrounding tea estates too. The area is very hilly. There are many tea estates in the area, either bordering or in the vicinity of the forest. There is gas production in the area, which is currently controversial in terms of conservation efforts. The forest is being degraded rapidly. Plant genetic resources (PGR) are one of the most important elements of biodiversity which support life systems on the earth. They are the global assets of incalculable value to present and future generations; and are the sources of improved yield and quality factors; and in all aspects, they represent the very foundation of human existence (FAO 1984). As a part of Indian-Subcontinent centre of plant diversity, Bangladesh is very rich in its plant genetic resources (Valilov 1926). But, numerous plant species are at risk of being lost in all or part of their distribution ranges because of reduction in their population number due to over exploitation (Das 1987).

MATERIALS AND METHODS

The phytosociological was carried out in the selected forest in the Lawachara forest in the Kamalgonj Upazila of Maulvi Bazar district from April 2007 to May 2008. For the present phytosociological analysis of the vegetation study we have selected 50 circular plots of 300 m² each area in the Lawachara forest. Plots were established randomly from different sites continuously at 100 m interval in any direction. The size of 300 m² and number of circular sampling were determined by the species area curve (Misra 1968). To exploratory and to ascertain the plant holdings of Lawachara forest, a detailed survey has been conducted. This work consisted of basic methodological approaches and survey. The plant resources of the study area were listed and recorded with their uses, and every species was identified separately. The total number of species in all the circular sampling was recorded and then the basal area of all the species was measured. The basal area i.e., the cross section area of a tree measured at 4.5 feet above the ground (cross section area of a tree at breast height). The trees more than 31.5 cm cbh (circumference at breast height i.e., 1.37 m above the ground) were individually measured for cbh. Individuals between 10.5 to 31.5 cm cbh were recorded either as saplings or shrubs and the individuals less than 10.5 cm cbh were considered as seedlings (Knight 1963). The existing plant species were identified on the site by the help of local people and my supervisor. The species were also identified with the help of different Journals and reference books. The major floristic works consulted Hooker (1872-97), Prain (1903), Brandis (1906), Zevan and de Wet (1982), Khan *et al.* (1996, 2001), Khan and Haq (2001) and Uddin *et al.* (2003). The families, genera and species are arranged

alphabetically. The species were also identified with the help of different journals and reference books. Some species could not be identified.

RESULTS

The study on plant genetic resources (PGR) in the Lawachara forest revealed a total 159 plant species was recorded under 123 genera and 60 families in Lawachara forest (Table 1a). As regards to their growth habits, some 78 species were found as trees, 14 species as shrubs, 42 species as herbs and 25 species as climbers (Table 4a). As regards to the diversity of species and genera, about 123 genera were recorded of which, *Ficus* and *Syzygium* were the largest genera having 7 species each. *Terminalia* and *Dioscorea* were the second largest genera with 4 species each followed by *Artocarpus*, *Calamus*, *Piper*, *Alpinia* and *Curcuma* having 3 species each. A total of 106 genera was recorded with a single species each (Table 2a). As regards to family composition, about 60 families were recorded in the list of which Leguminosae was the largest family having 12 genera with 13 species. Compositae was the second largest family containing 7 genera with 7 species each. Euphorbiaceae and Gramineae were the third largest family containing 6 genera and 6 species each followed by Anacardiaceae, Apocynaceae and Rubiaceae with 5 genera and 5 species while verbanaceae containing 5 genera with 6 species (Table 5a). Combretaceae, Cyperaceae, Dioscoreaceae, Guttiferae, Musaceae, Myrtaceae and Piperaceae were represented by single genus with multiple species each, and 30 families with only single species each (Table 1a). Some 85 species belonging to the 43 families were recorded by Chowdhury *et al.* (2000) in Dulhazara garjan forest of Bangladesh. International Union for Conservation of Nature (IUCN) (2009) reported 169 species of plants in Lawachara forest.

From the above result, it revealed that Lawachara forest contained the highest number of plant species with highest number of plant genera with 60 families. More importantly from the result it was evident that almost all the families at the forests were represented by single genera and the maximum number of genera by single species each indicating the poor diversity at family and genus levels. This situation demands urgent attention to enrich the plant diversity at genera and species levels to avoid the risk of extinction of single species or genera with single species. Malaker *et al.* (2008) indentified some threatened species of *Bridelia retusa*, *Zanthoxylum rhetsa*, *Alstonia scholaris*, *Phyllanthus emblica*, *Cassia fistula*, *Oreoxylum indicum* *Semocarpus anacardium*, *Garuga pinnata* etc. in Jaus bits and Beribaid bits of Madhupur sal forest.

DISCUSSION

Bangladesh is rich in field crops, fruits, nuts and forest plants covering a wide array of species, genera and families (Valilov 1926). Some of these species, especially fruit and timber yielding plants, are very common and distributed all over the country. The present investigation indicating that some of the common plant species are also present in the Lawachara forest which are similar to those of others (Chowdhury 1991, 1996; Talukder 1999). Along with the common fruit and timber yielding plants, many minor edible fruits, medicinal plants, rare and endangered plant species have also observed in this forest (Table 1a).

Medicinal plant species

Under medicinal plant species, a total of 92 medicinal plants species had been recorded in the Lawachara forest (Table 3a). Among the medicinal plant species, 24 tree, 12 shrub, 35 herb and 21 climber species were used as medicine (Table 4a).

Ornamental plant species

Under medicinal plant species, a total of 5 ornamental plants species had been recorded in the Lawachara forest (Table 3a). Among the ornamental plant species, 2 tree, 1 shrub, 1 climber and 1 herb species were used as ornamental (Table 4a).

Fruit plant species

Under medicinal plant species, a total of 24 fruit plant species had been recorded in the Lawachara forest (Table 3a). Among the fruit plant species, 21 tree, 2 herb and 1 climber species were used as fruit (Table 4a).

Timber plant species

Under medicinal plant species, a total of 31 timber plant species had been recorded in the Lawachara forest (Table 3a). Among the timber plant species, 31 tree species were used as timber (Table 4a).

Miscellaneous plant species

Under medicinal plant species, a total of 7 miscellaneous plant species had been recorded in the Lawachara forest (Table 3a). Among the medicinal plant species, 4 herbs (3 vegetable and 1 packing) and 3 climber species were used as miscellaneous (3 cane) (Table 4a).

Table 1a. Total number of genus and species as in April, 2007 to May, 2008 of Lawachara forest by family

Sl. No.	Family	No. of Genus	No. of Species
1.	Acanthaceae	2	2
2.	Amaranthaceae	2	2
3.	Anacardiaceae	5	5
4.	Apocynaceae	5	5
5.	Aquifoliaceae	1	1
6.	Araceae	3	5
7.	Asclepiadaraceae	1	1
8.	Bombacaceae	1	1
9.	Boraginaceae	1	1
10.	Burseraceae	1	1
11.	Celastraceae	1	1
12.	Combretaceae	1	4
13.	Commoliniaceae	1	1
14.	Compositae	7	7
15.	Conuaceae	1	1
16.	Cucurbitaceae	2	2
17.	Cuscutaceae	1	1
18.	Cyatheaceae	1	1
19.	Cyperaceae	1	2
20.	Dioscoreaceae	1	4
21.	Dipterocarpaceae	3	3
22.	Ebenaceae	1	1
23.	Elaeocarpaceae	1	1
24.	Euphorbiaceae	6	6
25.	Fagaceae	1	1
26.	Flacourtiaceae	2	2
27.	Graminae	6	6
28.	Guttiferae	1	2
29.	Junglandaceae	1	1
30.	Lauraceae	2	2
31.	Leguminosae	12	13
32.	Liliaceae	2	2
33.	Lyrthraceae	2	2
34.	Magnoliaceae	1	1
35.	Melastomaceae	1	1
36.	Meliaceae	3	3
37.	Moraceae	3	11
38.	Musaceae	1	3
39.	Myrsinaceae	1	1
40.	Myrtaceae	1	7
41.	Palmae	3	5
42.	Passifloraceae	1	1
43.	Piperaceae	1	3
44.	Polygoniaceae	1	1
45.	Polypodiaceae	1	1
46.	Ranunculaceae	1	1
47.	Rubiaceae	5	5
48.	Rutaceae	1	1

Table 1a. contd.

Sl. No.	Family	No. of Genus	No. of Species
49.	Schroplulariaceae	1	1
50.	Smilacaceae	1	1
51.	Solanaceae	1	1
52.	Sterculiaceae	2	2
53.	Taccaceae	1	1
54.	Theaceae	1	1
55.	Thymelaeaceae	1	1
56.	Tiliaceae	2	2
57.	Umbelliferae	1	1
58.	Verbenaceae	5	6
59.	Vitaceae	1	1
60.	Zingiberaceae	2	6
Total		123	159

Number of families with single genus with multiple species = 7

Number of families with single species only = 30

Table 2a. Total number of plant species as in April, 2007 to May, 2008 of Lawachara forest by genus and family

Sl.No.	Family	Genus	Species
1.	Acanthaceae	<i>Thunbergia</i>	1
2.		<i>Acanthus</i>	1
3.	Amaranthaceae	<i>Achyranthes</i>	1
4.		<i>Amaranthus</i>	1
5.	Anacardiaceae	<i>Holigarna</i>	1
6.		<i>Mangifera</i>	1
7.		<i>Spondias</i>	1
8.		<i>Swintonia</i>	1
9.		<i>Pegia</i>	1
10.	Apocynaceae	<i>Alstonia</i>	1
11.		<i>Rauwolfia</i>	1
12.		<i>Tabernemontana</i>	1
13.		<i>Ichnocarpus</i>	1
14.		<i>Holarrhena</i>	1
15.	Aquifoliaceae	<i>Illex</i>	1
16.	Araceae	<i>Colocasia</i>	2
17.		<i>Steudnera</i>	1
18.		<i>Amorphophallus</i>	2
19.	Asclepiadaceae	<i>Sarcolobus</i>	1
20.	Bombacaceae	<i>Bombax</i>	1
21.	Boraginaceae	<i>Heliotropium</i>	1
22.	Burseraceae	<i>Bursera</i>	1
23.	Celastraceae	<i>Lophopetalum</i>	1

Table 2a.Contd.

24.	Combretaceae	<i>Terminalia</i>	4
25.	Commoliniaceae	<i>Commelina</i>	1
26.	Compositae	<i>Ageratum</i>	1
27.		<i>Eupatorium</i>	1
28.		<i>Mikania</i>	1
29.		<i>Spilanthes</i>	1
30.		<i>Tridax</i>	1
31.		<i>Blumea</i>	1
32.		<i>Gnaphalium</i>	1
33.	Conuaceae	<i>Canna</i>	1
34.	Cucurbitaceae	<i>Coccinia</i>	1
35.		<i>Trichosanthes</i>	1
36.	Cuscutaceae	<i>Cuscuta</i>	1
37.	Cyatheaceae	<i>Cyathea</i>	1
38.	Cyperaceae	<i>Cyperus</i>	2
39.		<i>Cyperus</i>	
40.	Dioscoreaceae	<i>Dioscorea</i>	4
41.	Dipterocarpaceae	<i>Diptocarpus</i>	1
42.		<i>Hopea</i>	1
43.		<i>Shorea</i>	1
44.	Ebenaceae	<i>Diospyros</i>	1
45.	Elaeocarpaceae	<i>Elaeocarpus</i>	1
46.	Euphorbiaceae	<i>Aporusa</i>	1
47.		<i>Baccaurea</i>	1
48.		<i>Macaranga</i>	1
49.		<i>Mallotus</i>	1
50.		<i>Phyllanthus</i>	1
51.		<i>Manihot</i>	1
52.	Flacourtiaceae	<i>Flacourtia</i>	1
53.		<i>Hyndocarpus</i>	1
54.	Fagaceae	<i>Castanopsis</i>	1
55.	Graminae	<i>Sporobolus</i>	1
56.		<i>Axonopus</i>	1
57.		<i>Cynodon</i>	1
58.		<i>Digitaria</i>	1

Table 2a.Contd.

59.		<i>Imperata</i>	1
60.		<i>Setaria</i>	1
61.	Guttiferae	<i>Garcinia</i>	2
62.	Junglandaceae	<i>Engelhardtia</i>	1
63.	Lauraceae	<i>Cinnamomum</i>	1
64.		<i>Litsea</i>	1
65.	Leguminosae	<i>Acacia</i>	1
66.		<i>Albizia</i>	1
67.		<i>Cassia</i>	2
68.		<i>Entada</i>	1
69.		<i>Erythrina</i>	1
70.		<i>Mezoneuron</i>	1
71.		<i>Mimosa</i>	1
72.		<i>Mucuna</i>	1
73.		<i>Paraserianthes</i>	1
74.		<i>Spatholobus</i>	1
75.		<i>Tamarindus</i>	1
76.		<i>Xylia</i>	1
77.	Liliaceae	<i>Dracaena</i>	1
78.		<i>Urginea</i>	1
79.	Lyrthraceae	<i>Lawsonia</i>	1
80.		<i>Lagerstroemia</i>	1
81.	Magnoliaceae	<i>Michelia</i>	1
82.	Melastomaceae	<i>Melastoma</i>	1
83.	Meliaceae	<i>Chickrassia</i>	1
84.		<i>Swietenia</i>	1
85.		<i>Aphanamixis</i>	1
86.	Moraceae	<i>Artocarpus</i>	3
87.		<i>Ficus</i>	7
88.		<i>Streblus</i>	1
89.	Musaceae	<i>Musa</i>	3
90.		<i>Musa</i>	
91.		<i>Musa</i>	
92.	Myrsinaceae	<i>Ardisia</i>	1
93.	Myrtaceae	<i>Syzygium</i>	7
94.	Palmae	<i>Caryota</i>	1
95.		<i>Elaeis</i>	1
96.		<i>Calamus</i>	3

Table 2a.Contd.

97.	Passifloraceae	<i>Passiflora</i>	1
98.	Piperaceae	<i>Piper</i>	3
99.	Polygonaceae	<i>Polygonum</i>	1
100.	Polypodiaceae	<i>Dryopteris</i>	1
101.	Ranunculaceae	<i>Naravelia</i>	1
102.	Rubiaceae	<i>Adina</i>	1
103.		<i>Neolamarckia</i>	1
104.		<i>Tricalysia</i>	1
105.		<i>Mussaenda</i>	1
106.		<i>Hedyotis</i>	1
107.	Rutaceae	<i>Citrus</i>	1
108.	Schroplulariaceae	<i>Scoparia</i>	1
109.	Smilacaceae	<i>Smilax</i>	1
110.	Solanaceae	<i>Solanum</i>	1
111.	Sterculiaceae	<i>Firminia</i>	1
112.		<i>Ptereospermum</i>	1
113.	Taccaceae	<i>Tacca</i>	1
114.	Theaceae	<i>Schima</i>	1
115.	Thymelaeaceae	<i>Aquilaria</i>	1
116.	Tiliaceae	<i>Microcos</i>	1
117.		<i>Glycosmis</i>	1
118.	Umbelliferae	<i>Hydrocotyle</i>	1
119.	Verbenaceae	<i>Clerodendrum</i>	2
120.		<i>Gmelina</i>	1
121.		<i>Lantana</i>	1
122.		<i>Tectona</i>	1
123.		<i>Vitex</i>	1
124.	Vitaceae	<i>Leea</i>	1
125.	Zingiberaceae	<i>Alpinia</i>	3
126.		<i>Curcuma</i>	3
	Total		159

Genera with single species =106

Table 3a. Total number of family, genus and species as in April, 2007 to May, 2008 of Lawachara forest by different categories of plants

Sl.No	Use	Family	Genus	Species
1	Medicinal plants	49	77	92
2	Ornamental	4	4	5
3	Fruit	14	16	24
4	Timber	18	31	31
5	Miscellaneous	4	4	7
Total				159

Table 4a. Total number of tree, shrubs, herbs and climbers as in April, 2007 to May, 2008 of Lawachara forest by use

Sl.No	Use	Tree	Shrub	Herb	Climber	Total
1	Medicinal plants	24	13	35	20	92
2	Ornamental	2	1	1	1	5
3	Fruit	21	0	2	1	24
4	Timber	31	0	0	0	31
5	Miscellaneous	0	0	4	3	7
Total		78	14	42	25	159

Table 5a. Families with the highest number of genera as in April, 2007 to May, 2008 of Lawachara forest

Sl.No	Name of the family	No of genus	Rank
1.	Leguminosae	12	(i)
2.	Euphorbiaceae	6	(ii)
3.	Graminae	6	(iii)
4.	Compositae	6	(iv)
5.	Anacardiaceae	5	(v)
6.	Rubiaceae	5	(vi)
7.	Verbenaceae	5	(vii)
8.	Apocynaceae	4	(viii)

CONCLUSION

Lawachara sal forest revealed a total of 159 plant species was recorded under 123 genera and 60 families of which about 78, 14, 42 and 25 species were classified as under tree, shrub, herb and climber, respectively according to their growth habits. More importantly from the result it was evident that almost all the families at the forests were represented by single genera and the maximum number of genera by single species each indicating the poor diversity at family and genus levels. This situation demands urgent attention to enrich the plant diversity at genera and species levels to avoid the risk of extinction of single species or genera with single species.

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