

FOREST FLORA OF NICHLAUL—III. PHYTOSOCIOLOGICAL STUDIES

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ABSTRACT

The present paper deals with the phytosociological studies of Nichlaul forest. Important features of the forest concerning geographical location, topography, soil, climate and vegetational composition have been outlined. Eight types of plant communities have been recognised. The phytosociological characters noted in the field on visual estimation are dominance and sociability of perennial species. Only selected associates of the communities have been included in the table.

The eight types of communities described appear to be interrelated floristically. The sociological values show that 17.8% of the species are common to all the eight communities indicating a high degree of congruity.

INTRODUCTION

There have been a few noteworthy contributions on the flora of Gorakhpur during recent years (Sen, 1959, 1960; Dixit *et al.* 1968; Sahai and Sinha, 1968). However, these are based on the herbaceous angiosperms of the area. Panigrahi and Saran (1967) have recorded 102 woody species during their floristic studies of the entire Gorakhpur Forest Division. During the course of the present study the authors have collected 203 woody species from the Nichlaul forest of Gorakhpur Division. Sharma *et al.* (1969) confined their studies to pteridophytes only during their exploration of the forests of Gorakhpur Division. The present paper, III in the series of Forest Flora of Nichlaul deals with the phytosociological studies of the forest only.

GEOGRAPHICAL LOCATION

The forests of Gorakhpur Division are situated in Maharajganj, Pharenda and Sadar tehsils of Gorakhpur district. They lie between $26^{\circ}42'$ and $27^{\circ}25'$ N latitude and $83^{\circ}13'$ and $83^{\circ}52'$ E longitude.

Nichlaul forest has been selected for the present investigation. The forest under study lies 91 km north-west of Gorakhpur in Maharajganj tehsil and is next to the foot-hills of Nepal-Himalayas. The total area is about 5,231.78 hectares. The average altitude of the area is about 99.77 meters above the sea-level.

TOPOGRAPHY

The land surface is apparently a level tract sloping gently from north-west to south-east. A remarkable feature of its landscape is the total absence of any hill or hillock. The forest is mainly intersected by the river Gandak which drains the entire area.

Due to recent construction of Gandak canal, the drainage of the forest has been badly impeded resulting in the submergence of the area for about four months every year. Besides, there are many tals, nullahs and low lying areas which remain inundated during and for some months after the rains.

SOIL

The soil is composed of Gangetic alluvium. Since much of the ground is liable to inundation, the particles deposited are very fine. In most places the soil is of heavy texture, although the banks of the river have soil of a coarser nature as the heavier silt gets deposited there. The subsoil, mostly of land clay, is poorly aerated with little thickness of loam at the surface. Beneath this, at depths varying from a few to six meters or more, there is usually a deposit of pure sand (Tiwari, 1965).

CLIMATE

The average rainfall is about 1200 mm. The monsoon rains commence during June (2nd-3rd week) and come to an end in September but may persist till October. From October to May there is the usually a long dry weather with only scanty winter rains. The hot weather commences in March and lasts till the rains set in. The minimum temperature goes down to 6°C in the month of January and maximum rises upto 43°C in the month of June.

VEGETATION

The vegetation of the area is almost of moist deciduous type. However, some of the trees are evergreen and semi-evergreen. Following Champion

and Seth (1962), the forest under study may be categorised as under:

- (A) Eastern heavy alluvium sal
- (B) West Gangetic moist deciduous forest
- (C) Seasonal swamp forest
- (D) Low alluvial savannah woodland.

(A) *Eastern heavy alluvium sal*: This occupies one third of the entire forest. The principal species is *Shorea robusta* Gaertn. which is gregarious in habit.

The forest can easily be distinguished in three stories. The top storey is composed of *Adina cordifolia* (Roxb.) Hook. f. ex Brandis, *Bombax ceiba* Linn., *Bridelia squamosa* (Lamk.) Gehrm., *Dalbergia sissoo* Roxb., *Dillenia pentagyna* Roxb., *Diospyros exsculpta* Buch.-Ham., *Lagerstroemia parviflora* Roxb., *Lannea coromandelica* Merrill, *Terminalia alata* Heyne ex Roth and *T. chebula* Retz. Climbing upto the top of the trees, are the gigantic climbers like *Acacia sinuata* (Lour.) Merr., *Butea parviflora* Roxb., *Capparis zeylanica* Linn., *Combretum roxburghii* Spreng., *Erycibe paniculata* Roxb., *Zizyphus rugosa* Lamk. etc.

The middle storey is constituted by *Aegle marmelos* (Linn.) Corr., *Anthocephalus cadamba* Miq., *Croton roxburghii* Bal., *Ehretia laevis* Roxb., *Mallotus philippensis* Muell.-Arg., *Milusa tomentosa* J. Sinclair, *Schielchera oleosa* Oken, *Semecarpus anacardium* Linn. f., *Xeromphis spinosa* (Thunb.) Keay. The common climbing plants on these species are: *Capparis zeylanica* Linn., *Cissampelos pariera* Linn., *Dalbergia volubilis* Roxb., *Hemidesmus indicus* R. Br., *Porana paniculata* Roxb., *Stephania japonica* (Thunb.) Miers.

The third and lowermost storey consists of shrubby undergrowth of *Ardisia solanacea* Roxb., *Baliospermum montanum* (Willd.) Muell.-Arg., *Carissa opaca* Stapf, *Clerodendrum indicum* (Linn.) O. Kuntze, *C. viscosum* Vent., *Glycosmis mauritiana* (Lamk.) Tanaka, *Grewia rothii* DC., *Leea edgeworthii* Santapau, *Solanum erianthum* D. Don and *Zizyphus nummularia* (Burm. f.) Wt. & Arn.

(B) *West Gangetic moist deciduous forest*: This occupies the north-west portion of the forest. It contains luxuriant teak crops. The chief associates are: *Albizia lebeck* (Linn.) Benth., *Alangium salvifolium* (Linn. f.) Wang, *Bridelia squamosa* (Lamk.) Gehrm., *Careya arborea* Roxb., *Casearia elliptica* Willd., *Cassia fistula* Linn., *Citrus medica* Linn., *Ficus racemosa* Linn., *F. religiosa* Linn., *F.*

semicordata Buch.-Ham., *Mallotus philippensis* (Lamk.) Muell.-Arg., *Milusa tomentosa* (Roxb.) J. Sinclair, *Streblus asper* Lour.

The undergrowth of teak is quite poor. The prominent shrubs scattered rather sparsely in the area are *Carissa opaca* Stapf, *Clerodendrum viscosum* Vent., *Pogostemon benghalense* (Burm.) O. Kuntze, *Streblus asper* Lour. Climbers are not seen in this area.

(C) *Seasonal swamp forest*: The swamp forest occurs in low-lying areas which remain inundated during and for some months after the rains. This is chiefly located along the river—Little Gandak. The soil of this area usually consists of fine clay and is very rich in humus. Some of the characteristic species found in this area are: *Adina cordifolia* (Roxb.) Hook. f., *Alangium salvifolium* (Linn. f.) Wang, *Alstonia scholaris* (Linn.) R. Br., *Aphanamixis polystachya* (Wall.) Parker, *Ardisia solanacea* Roxb., *Bischofia javanica* Blume, *Calamus tenuis* Roxb., *Celtis tetrandra* Roxb., *Cordia dichotoma* Forest. f., *Ficus benjamina* Linn. var. *comosa* King, *F. heterophylla* Linn. f., *Glochidion multiloculare* Voigt, *Grewia disperma* Rottle. ex Spreng, *Kirganelia reticulata* (Poir.) Baill., *Litsea glutinosa* (Lour.) C. B. Robins, *Pongamia pinnata* (Linn.) Pierre, *Putranjiva roxburghii* Wall., *Salix tetrasperma* Roxb., *Syzygium cumini* Skeels, *Vitex negundo* Linn., *Woodfordia fruticosa* (Linn.) Kurz etc.

The most conspicuous climbers are *Ampelocissus latifolia* (Roxb.) Planch, *Argyrea sericea* Dalz., *Bridelia stipularis* Blume, *Cissus adnata* Roxb., *Clematis gouriana* Roxb. ex DC., *Ichnocarpus frutescens* (Linn.) Ait., *Ipomoea muricata* (Linn.) Jacq., *Mallotus repandus* Muell.-Arg., *Porana paniculata* Roxb., *Rivea hypocrateriformis* Choisy, *Stephania japonica* (Thunb.) Miers, *Tiliacora acuminata* (Lamk.) Miers, *Tinospora cordifolia* (Willd.) Miers etc.

(D) *Low alluvial savannah woodland*: This type occurs on the higher and more stable alluvial terraces. Such a forest is characterised by an assemblage of large number of species. Prominent trees forming the upper storey in this area are: *Albizia procera* (Roxb.) Benth., *Bombax ceiba* Linn., *Dalbergia sissoo* Roxb., *Ficus racemosa* Linn., *Lannea coromandelica* Merrill, *Tectona grandis* Linn. f., *Wendlandia heynei* (R. & S.) Steud.

The middle storey consists of *Acacia catechu* Willd., *Ailanthus excelsa* Roxb., *Aphanamixis polystachya* (Wall.) Parker, *Callicarpa arborea*

Roxb., *Emblica officinalis* Gaertn., *Flacourtia indica* Merr., *Garuga pinnata* Roxb., *Gmelina arborea* Roxb., *Terminalia bellirica* (Gaertn.) Roxb., *Trewia polycarpa* Benth., *Xeromphis spinosa* (Thunb.) Keay, *Zizyphus xylopyrus* Willd.

Most common shrubs and climbers are: *Alangium salvifolium* (Linn. f.) Wang., *Ampelocissus latifolia* (Roxb.) Planch., *Ardisia solanacea* Roxb., *Calamus tenuis* Roxb., *Cissus adnata* Roxb., *Colebrookia oppositifolia* Smith, *Glochidion multiloculare* Voigt, *Murraya koeingii* (Linn.) Spreng., *Polyalthia suberosa* (Roxb.) Thw., *Pogostemon benghalense* (Burin.) O. Kuntze, *Solanum torvum* Swartz, *Tiliocora acuminata* (Lamk.) Miers, *Ventilago maderaspatana* Gaertn.

The common grasses found in this area are: *Apluda mutica* Linn., *Phragmites maxima* (Forsk.) Blatt. & McC., *Saccharum spontaneum* Linn. Some of the interesting dwarf species found in this localities are: *Careya herbacea* Roxb., *Combretum nanum* Buch-Ham. ex Don, *Crewia sapida* Roxb.

PHYTOSOCIOLOGY OF THE FOREST

The phytosociology as proposed by Braun-Blanquet (1932) seeks to investigate the structure and floristic composition of plant communities or plant associations. Phytosociological investigations of various vegetational types have been made by a number of workers (Poore, 1955-1956; Oosting, 1958; Brown, 1961 etc.). Some of the remarkable works of this nature have also been done on Indian Forests (Misra and Joshi, 1952; Joshi, 1958; Bhata-nagar, 1960; Pandeya, 1961; Marlange and Meher-Homji, 1965).

The phytosociological values necessary for characterisation of a community are not agreed upon by all workers even to-day. Some early workers attempted to describe communities on the basis of the values for a particular attribute e.g. frequency. However, more useful informations about the communities can be gathered by taking various values into consideration simultaneously.

The present investigation has been based upon Braun-Blanquet's method with a slight modification in scale (Bharucha and De Leeuw, 1957). The phytosociological characters noted in the field were 'Dominance', 'Sociability' and 'Stratification'. Bharucha and De Leeuw (1957) have grouped the usual characters of 'dominance' and 'abundance' in a single determination, called 'dominance'. Thus, each individual species has been classified for its 'dominance' and 'sociability'.

A. For dominance the following scale has been used:

- + when the number of individuals and the area covered are both very small.
- 1. when the number of individuals is rather large but the area covered is small.
- 2. when individuals are very numerous and the area covered is at least 1/20 of the surface.
- 3. any number of individual covering from 1/4 to 1/2 of the area.
- 4. any number of individual covering from 1/2 to 3/4 of the area.
- 5. any number of individual covering more than 3/4 of the area.

B. For sociability the following scale has been used:

- 1. shoots growing singly.
- 2. species growing in small groups.
- 3. species growing in big patches or large colonies.
- 4. species growing in small colonies.
- 5. when species cover an extensive area.

During the floristic composition studies the following eight communities were recognised. In each of these, the dominance and sociability of species have been noted on visual estimation.

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|--------------|---------------------------|
| 1. Shorea | — Mallotus community. |
| 2. Shorea | — Terminalia community. |
| 3. Shorea | — Schleicheria community. |
| 4. Shorea | — Syzygium community. |
| 5. Tectona | — Streptopus community. |
| 6. Syzygium | — Barringtonia community. |
| 7. Syzygium | — Ficus community. |
| 8. Dalbergia | — Acacia community. |

In table I, the above communities have been indicated by numbers 1-8. Of the paired values given against each species in different communities, the first shows dominance and the second indicates sociability. Only selected associates of the communities have been included in the table I.

TABLE I

Dominance and sociability of selected species of the eight plant communities of the forest

Species	Communities							
	1	2	3	4	5	6	7	8
<i>Acacia catechu</i> Willd.	—	+1	—	—	—	—	—	5,5
<i>A. sinuata</i> (Lour.) Merr.	...	1,3	+1	1,3	—	1,2	+1	+1
<i>Adina cordifolia</i> (Roxb.) Hook. f.	...	+1	+1	+1	+1	—	+1	+1
<i>Aegle marmelos</i> (Linn.) Corr.	...	+1	+1	+1	+1	+1	+1	+1

Species	Communities							
	1	2	3	4	5	6	7	8
<i>Ailanthus excelsa</i> Roxb.	...	+1	—	—	+1	—	—	—
<i>Alangium salvifolium</i> (Linn. f.) Wang.	...	+2	—	2,3	+1	2,3	3,2	+1
<i>Albizia lebbek</i> Benth.	...	+1	+1	—	—	—	—	—
<i>A. procera</i> (Roxb.) Benth.	...	+1	+1	—	—	+1	+1	+1
<i>Alstonia scholaris</i> (Linn.) R. Br.	...	—	—	+1	—	+1	+1	—
<i>Ampelocissus latifolia</i> (Roxb.) Planch.	...	—	+1	+1	—	1,1	1,1	—
<i>Anthocephalus cadamba</i> Miq.	...	+1	+1	+1	—	+1	+1	—
<i>Antidesma ghaesembilla</i> Gaertn.	...	+1	+1	+1	+1	+1	—	+1
<i>Aphanamixis polystachya</i> (Wall.) Parker	...	+3	+1	+1	1,2	+1	+1	+1
<i>Ardisia solanacea</i> Roxb.	...	+2	+1	+1	1,3	+1	+2	+1
<i>Argyrea sericea</i> Dalz.	...	—	—	1,1	—	—	+1	—
<i>Arctocarpus lakoecha</i> Roxb.	...	—	—	—	—	+1	—	—
<i>Asparagus racemosus</i> Willd.	...	—	+1	+1	—	+1	—	+1
<i>Baliospermum montanum</i> (Willd.) Muell.-Arg.	...	+2	+1	1,2	+1	1,2	+1	+1
<i>Bambusa arundinacea</i> (Retz.) Willd.	...	—	—	—	+2	—	—	+2
<i>Barringtonia acutangula</i> Gaertn.	...	—	—	+1	—	5,5	1,1	—
<i>Beilschmedia roxburghiana</i> Nees	...	+1	—	+1	—	—	—	—
<i>Bischofia javanica</i> Bl.	...	—	—	+1	—	1,2	+1	—
<i>Bombax ceiba</i> Linn.	...	+1	+1	+1	+1	+1	+1	+1
<i>Bridelia squamosa</i> (Lamk.) Gehrm.	...	+1	+1	+1	—	+1	+1	+1
<i>Butea monosperma</i> Taub.	...	+1	—	—	—	—	—	—
<i>B. parviflora</i> Roxb.	...	1,2	+1	—	—	—	—	—
<i>Caesalpinia decapetala</i> Alston	...	+1	—	—	1,2	1,3	+2	+1
<i>Calamus tenuis</i> Roxb.	...	—	—	+1	—	1,2	2,2	—
<i>Callicarpa arborea</i> Roxb.	...	+1	—	—	—	—	—	+2
<i>C. macrophylla</i> Vahl	...	1,2	1,2	+1	1,2	+2	+2	2,2
<i>Capparis zeylanica</i> Linn.	...	+1	1,2	1,2	—	+1	—	+2
<i>Careya arborea</i> Roxb.	...	+1	—	—	—	—	—	+2
<i>C. herbacea</i> Roxb.	...	—	—	—	—	—	—	+2
<i>Carissa opaca</i> Stapf	...	+2	+1	+1	+1	1,2	+2	+1
<i>Casuarina elliptica</i> Willd.	...	+1	+1	+1	+1	—	—	+1
<i>Cassia fistula</i> Linn.	...	+1	+1	+1	+1	+1	—	+1
<i>Cayratia trifolia</i> Domin	...	+1	—	—	+1	+1	+1	+1
<i>Celastrus paniculata</i> Willd.	...	+1	—	+1	+1	—	+1	+1
<i>Celtis tetrandra</i> Roxb.	...	—	—	—	—	+1	+1	—
<i>Cissampelos pariera</i> Linn.	...	+1	+1	+1	—	+1	+1	+1
<i>Cissus adnata</i> Roxb.	...	—	—	—	+1	1,2	1,2	+1
<i>Citrus medica</i> Linn.	...	—	+1	+1	—	—	+1	—
<i>Combretum roxburghii</i> Spreng.	...	1,3	+2	+1	+1	—	—	—
<i>C. nanum</i> Buch.-Ham. ex D. Don	...	—	—	—	—	—	—	+2
<i>Clausena pentaphylla</i> DC.	...	+1	+2	+1	—	—	+1	+1
<i>Clematis gouriana</i> Roxb. ex DC.	...	—	—	—	+1	+1	+1	—
<i>Clerodendrum indicum</i> O. Kuntze	...	+1	+2	+1	+3	+2	+1	+1
<i>C. viscosum</i> Vent.	...	3,3	+1	+1	1,3	+1	2,3	2,2
<i>Colebrookia oppositifolia</i> Smith	...	—	—	—	—	+2	2,3	+2
<i>Cordia dichotoma</i> Forst. f.	...	+1	+1	+1	+1	—	+1	—
<i>Croton roxburghii</i> Bal.	...	3,3	1,1	1,1	+1	—	+1	+1
<i>Dalbergia lanceolaria</i> Linn. f.	...	+1	+1	+1	—	—	—	—
<i>D. sissoo</i> Roxb.	...	+1	+1	+2	+1	+1	+1	+1
<i>D. volubilis</i> Roxb.	...	+2	+1	+1	—	—	—	+1
<i>Dillenia pentagyna</i> Roxb.	...	+1	+1	—	+1	+1	—	—
<i>Dioscorea bulbifera</i> Linn.	...	—	—	+1	+1	—	+1	+1
<i>Diospyros exsculpta</i> Buch.-Ham.	...	+1	+1	+1	—	—	—	—
<i>Ehretia laevis</i> Roxb.	...	+1	+1	+1	—	+1	+1	+1
<i>Eleodendron roxburghii</i> Wt. & Arn.	...	—	—	—	+1	—	—	—
<i>Emblica officinalis</i> Gaertn.	...	+1	+1	+1	+1	—	+1	+1
<i>Embelia tsjarian-cottam</i> A. DC.	...	+1	+1	—	—	—	—	—
<i>Erycibe paniculata</i> Roxb.	...	+2	+1	—	—	—	—	—
<i>Erythrina indica</i> Lamk.	...	+1	—	—	—	+1	—	—
<i>Ficus benjamina</i> Linn. var. <i>comosa</i> King	...	—	—	—	+1	—	—	—
<i>F. heterophylla</i> Linn. f.	...	—	—	—	+1	+1	+1	—
<i>F. hispida</i> Linn. f.	...	—	—	+1	—	+1	+1	+1
<i>F. racemosa</i> Linn.	...	+1	+1	+1	+1	+2	4,5	+1
<i>F. rumphii</i> Bl.	...	—	—	—	—	1,2	4,5	—
<i>F. semicordata</i> Buch.-Ham.	...	—	—	—	+1	+1	2,4	—
<i>Garuga pinnata</i> Roxb.	...	+1	+1	—	—	—	—	+1
<i>Glochidion hoheneckeri</i> Bedd.	...	+1	—	—	—	—	—	—
<i>G. multiloculare</i> Voigt	...	+1	+1	+1	+2	+1	+1	+1
<i>Gloriosa superba</i> Linn.	...	—	—	—	—	+1	—	+1
<i>Glycosmis mauritiana</i> (Lamk.) Tanaka.	...	+2	+1	+1	+2	+1	+1	+1

Species	Communities							
	1	2	3	4	5	6	7	8
<i>Gmelina arborea</i> Roxb.	...	—	—	—	—	—	—	+1
<i>Grewia disperma</i> Rottl. ex Spreng.	...	—	—	+1	—	+1	+1	—
<i>G. elastica</i> Royle	...	—	—	+1	+1	+1	+1	—
<i>G. rothii</i> DC.	...	+1	—	+2	+1	+1	—	—
<i>G. sapida</i> Roxb.	...	—	—	—	—	—	—	+2
<i>Helicteres isora</i> Linn.	...	+1	—	—	—	—	—	—
<i>Hemidesmus indicus</i> Schultes	...	+1	+1	+1	—	+1	+1	+1
<i>Holarrhena antidysenterica</i> Wall. ex DC.	...	2,2	1,1	1,2	1,1	+1	1,1	1,1
<i>Hymenodictyon excelsum</i> Wall.	...	+1	+1	—	—	+1	+1	+1
<i>Hyptianthera stricta</i> Wt. & Arn.	...	—	—	+1	—	2,2	1,2	—
<i>Ichnocarpus frutescens</i> Ait.	...	+1	+1	—	+1	+1	+1	+1
<i>Ixora arborea</i> Roxb. ex Sm.	...	—	+1	—	+2	+1	+1	+1
<i>Jasminum multiflorum</i> Andr.	...	—	—	+1	—	2,2	+1	+1
<i>Jatropha curcas</i> Linn.	...	—	+1	+1	—	+1	—	+1
<i>Kirganelia reticulata</i> (Poir.) Baill	...	+1	—	+1	—	1,2	+1	+1
<i>Kydia calycina</i> Roxb.	...	+1	—	+1	+1	+1	+1	—
<i>Lagerstroemia parviflora</i> Roxb.	...	+1	+1	+1	+1	+1	+1	+1
<i>Lannea coromandelica</i> Merrill	...	+1	+1	+1	—	+1	+1	+1
<i>Litsea glutinosa</i> C. B. Robins	...	—	—	+1	+1	+1	+1	+1
<i>L. monopetala</i> Pers.	...	—	—	+1	—	+1	+1	+1
<i>Madhuca indica</i> Gmel.	...	+1	+1	+1	—	—	—	—
<i>Mallotus philippensis</i> Muell.-Arg.	...	3,2	2,2	2,2	+1	+1	+1	+1
<i>M. repandus</i> Muell.-Arg.	...	—	—	—	+1	+1	+1	—
<i>Mangifera indica</i> Linn.	...	+1	+1	+1	—	+1	—	—
<i>Milletia auriculata</i> Baker	...	+2	1,2	1,2	—	—	—	—
<i>Miliusa tomentosa</i> J. Sinclair	...	+1	+1	+1	+1	+1	+1	+1
<i>M. velutina</i> Hook. f. & Thoms.	...	—	—	+1	+1	+1	+1	+1
<i>Mimosa himalayana</i> Gamble	...	+1	+1	+1	—	+1	+1	+1
<i>Mitragyna parvifolia</i> Korth.	...	+1	+1	+1	+1	+1	+1	+1
<i>Mucuna pruriens</i> Hook.	...	+1	+1	—	—	+1	—	—
<i>Murraya koenigii</i> (Linn.) Spreng.	...	+1	—	+1	—	1,2	+2	+2
<i>Oroxylum indicum</i> (Linn.) Vent.	...	+1	+1	—	+1	—	—	—
<i>Ougeinia oejinensis</i> Hook.	...	+1	+1	+1	—	—	—	—
<i>Oxystelma esculentum</i> Schultes	...	—	—	+1	—	+1	+1	—
<i>Phanera vahlii</i> (Wt. & Arn.) Benth.	...	+3	—	+1	+1	—	+1	+1
<i>Phoenix sylvestris</i> Roxb.	...	—	—	—	—	—	+1	+1
<i>Phragmites maxima</i> (Forsk.) Blatt.	...	—	—	—	+1	+1	—	—
<i>Ptilostigma malabaricum</i> (Roxb.) Benth.	...	+1	+1	+1	+1	+1	+1	+1
<i>Piper longum</i> Linn.	...	—	—	—	+1	+1	1,3	—
<i>Pogostemon benghalense</i> (Burm.) O. Kuntze	...	2,2	+1	+1	+1	1,3	1,2	+1
<i>Pongamia pinnata</i> (Linn.) Pierre	...	—	—	+1	—	+1	+1	—
<i>Porana paniculata</i> Roxb.	...	+1	—	—	+1	—	+1	+1
<i>Polyalthia suberosa</i> Thw.	...	+1	—	—	—	1,2	2,3	+1
<i>Premna latifolia</i> Roxb.	...	+1	—	—	+1	+1	+1	+1
var. <i>mucronata</i> (Roxb.) Clarke	...	—	—	—	—	—	—	—
<i>Psidium guajava</i> Linn.	...	+1	—	—	+1	+1	—	—
<i>Putranjiva roxburghii</i> Wall.	...	+1	—	+1	+1	2,2	2,3	+1
<i>Rauwolfia serpentina</i> Benth.	...	—	—	—	+1	+1	+1	—
<i>Rivea hypocrateriformis</i> Choisy	...	—	—	—	+1	+1	+1	—
<i>Salix tetrasperma</i> Roxb.	...	—	—	—	—	+1	+1	—
<i>Schleichera oleosa</i> Oken	...	+1	+1	2,3	+1	+1	+1	+1
<i>Semecarpus anacardium</i> Linn. f.	...	+1	+1	+1	+1	—	—	+1
<i>Shorea robusta</i> Gaertn.	...	5,5	5,5	5,5	5,5	+1	—	+1
<i>Smilax prolifera</i> Roxb.	...	+1	+1	+1	+1	—	+1	+1
<i>S. zeylanica</i> Linn.	...	+1	+1	—	+1	—	+1	—
<i>Solanum erianthum</i> O. Kuntze	...	+1	+1	—	+1	—	+1	+1
<i>S. torum</i> Swartz	...	+1	+1	—	+1	—	+1	+1
<i>Spondias pinnata</i> Kurz	...	+1	+1	+1	—	+1	+1	—
<i>Streblus asper</i> Lour.	...	+1	+1	+1	—	5,5	+1	+1
<i>Syzygium cumini</i> Skeels	...	+1	+1	+1	5,5	+1	5,5	+1
<i>S. heyneanum</i> Wall. ex Gamble	...	+1	+1	1,2	5,5	+1	5,5	1,2
<i>Tamarix dioica</i> Roxb.	...	+1	—	—	+1	—	+2	—
<i>Tectona grandis</i> Linn. f.	...	+1	1,2	+1	+1	5,5	—	+1
<i>Tetragium lanceolatum</i> Planch.	...	+1	+1	—	+1	—	+1	—
<i>Terminalia alata</i> Heyne ex Roth	...	+1	1,2	+1	+1	+1	+1	+1
<i>T. bellirica</i> (Gaertn.) Roxb.	...	+1	+1	+1	—	—	—	+1
<i>T. chebula</i> Retz.	...	+1	+1	+1	—	—	—	+1
<i>Tinospora cordifolia</i> Miers.	...	+1	—	—	+1	—	+1	+1

Species	Communities							
	1	2	3	4	5	6	7	8
<i>Toona ciliata</i> Roem.	...	+,1	+,1	+,1	—	—	—	+,1
<i>Trema orientalis</i> Bl.	...	+,1	—	—	+,1	+,1	+,1	+,1
<i>Trewia polycarpa</i> Benth.	...	—	—	—	1,2	1,1	1,1	+,1
<i>Typha angustata</i> Bory & Chaub.	...	—	—	—	—	+,2	+,2	—
<i>Vallisneria spiralis</i> Spreng.	...	+,1	—	+,2	—	—	—	+,2
<i>Ventilago maderaspatana</i> Gaertn.	...	+,1	+,1	+,1	—	+,1	+,1	—
<i>Vitex negundo</i> Linn.	...	+,1	—	—	+,1	+,2	+,2	—
<i>Wendlandia heynei</i> Santapau & Merchant	...	—	—	—	+,1	2,1	2,1	+,1
<i>Woodfordia fruticosa</i> Kurz	...	+,2	+,1	+,1	1,3	+,1	+,2	+,1
<i>Xeromphis spinosa</i> Keay	...	+,1	+,1	—	+,1	—	—	+,2
<i>X. uliginosa</i> (Retz.) Mahesh.	...	—	—	+,1	—	+,1	—	+,1
<i>Xylosma longifolium</i> Clos.	...	+,1	—	1,2	—	—	2,1	+,1
<i>Zizyphus mauritiana</i> Lamk.	...	+,1	+,1	+,1	—	+,1	—	+,1
<i>Z. nummularia</i> Wt. & Arn.	...	+,1	+,1	+,1	+,2	+,2	+,1	+,2
<i>Z. rugosa</i> Lamk.	...	+,1	+,1	+,1	—	+,1	+,1	+,1
<i>Z. xylopyrus</i> Willd.	...	+,1	—	—	—	+,1	+,1	+,1

Sign (—) used in table indicates the absence.

The eight types of communities described appear to be interrelated floristically. The sociological values (Table I) show that 17.8% of the species are common to all the eight communities, indicating a high degree of congruity.

The dominant species of the forest would appear to be *Shorea robusta* Gaertn., *Mallotus philippensis* Muell.-Arg., *Syzygium cumini* Skeels, *Barringtonia acutangula* Gaertn., *Dalbergia sissoo* Roxb. and *Acacia catechu* Willd.

It is interesting to note that the species like *Alstonia scholaris* (Linn.) R. Br., *Barringtonia acutangula* Gaertn., *Bischofia javanica* Bl., *Calamus tenuis* Roxb., *Ficus benjamina* Linn. var. *comosa* King, *Ficus semicordata* Buch.-Ham., *Grewia disperma* Rottle. ex Spreng., *Mallotus repandus* Muell.-Arg., *Oxystelma esculentum* Schultes, *Phragmites maxima* (Forsk.) Blatt., *Pongamia pinnata* (Linn.) Pierre, *Rivea hypocrateriformis* Choisy, *Salix tetrasperma* Roxb. and *Typha angustata* Bory & Chaub prefer moist situations.

Careya herbacea Roxb., *Combretum nanum* Buch.-Ham ex D. Don, *Gmelina arborea* Roxb., *Grewia sapida* Roxb., *Phoenix sylvestris* Roxb. are confined to grasslands only.

At places, certain species like *Alangium salvi-folium* Wang, *Calamus tenuis* Roxb., *Clerodendrum viscosum* Vent., *Colebrookia oppositifolia* Smith, *Glycosmis mauritiana* (Lamk.) Tanaka, *Hyptianthera stricta* Wt. & Arn., *Ixora arborea* Roxb. ex Sm., *Woodfordia fruticosa* Kurz, *Zizyphus nummularia* Wt. & Arn., are found in large colonies,

which may be due to their inefficient seed dispersal mechanism.

Some of the robust climbers like *Butea parviflora* Roxb., *Combretum roxburghii* Spreng., *Dalbergia volubilis* Roxb., *Erycibe paniculata* Roxb., *Hemidesmus indicus* Schultes, *Milletia auriculata* Baker, are restricted to plant communities 1-4 only.

Further the study shows that there is total absence of climbing plants in Tectona-Streblus community (Community 5).

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