

A PHYTOSOCIOLOGICAL STUDY OF WOODY VEGETATION NEAR IBADAN, NIGERIA

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ABSTRACT

The structure and floristic composition of both woody and herbaceous vegetation in the Botanical Garden of the University of Ibadan campus in Nigeria were studied. The area experiences tropical climate having an annual rainfall of 1,740.3 mm and the average mean daily temperature of 25° to 29° C. All the species observed during the point-centered quarter analysis (121 species) and also the others (52 species) were recorded. The vegetation was dominated by phanerophytes. The families represented by the greatest number of species were Leguminosae, Euphorbiaceae, Bignoniaceae, Sterculiaceae and Apocynaceae. The herbaceous vegetation was studied by laying down quadrats, and consisted of 59 species.

Based on the Importance Value Index, the woody vegetation was named as *Delonix-Elaeis-Lagerstroemia* Community while the herbaceous vegetation was *Tridax-Synedrella-Pennisetum* Community. The association index calculated for the species having the highest frequency with certain other species revealed that *Colapogonium mucinoides* and *Sida acuta* were highly associated. Seasonality effect was not marked in the prevailing vegetation.

INTRODUCTION

Vegetation description and its subsequent classification is quite a diverse and complex subject. This is all the more true for a tropical forest. According to Richards (1957) mature lowland tropical rainforest is extremely rich in tree species, none of which is dominant by itself. Ibadan comes under the zone of forest savanna mosaic according to Keay (1959). Some of the significant contributions towards vegetation analysis around Ibadan are those of Clayton (1958), Hopkins (1962, 1965, 1968), Hall and Okali (1978, 1979) and Njoku (1963). The aim of this study is to analyse the structural and floristic information of both woody and herbaceous vegetation in the arboretum of the University of Ibadan. The results may be useful for other researchers who make attempts to record all species presented in samples of vegetation. The investigation was carried out during 1979-1980.

STUDY AREA

The University of Ibadan is situated about 6 km. North of the city of Ibadan at approximately latitude 7°26' North and longitude 3°54' East. The mean altitude is 220 metres above sea level. The University Botanical Garden has been developed to over 40 hectares by the side of the river Ona which is a sluggish perennial stream during the dry season. The Garden serves primarily for the teaching and research by providing a wide range of plants including those from other countries. The area does not appear to have been burned or disturbed heavily except the trampling activities of the visitors to the Garden. The soil is freely drained, mildly acidic and of moderate fertility with colluvial deposits in the river valley and numerous outcrops of granite-gneiss rocks on higher ground (Scott-Emuakpor, 1978). The textural analysis of the soil revealed sand

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30.57 $\pm$ 0.25%, silt 64.47 $\pm$ 0.25% and clay to be 4.17 $\pm$ 0.15%.

As climate and vegetation show a very close relationship and it is even possible to regard vegetation as an indicator of climate, it is desirable to have some idea of the climate of the area. The various meteorological instruments are located on the ground level within the Campus at a distance of approximately 1 km from the study site. The climatic data for 1979 indicate the following features of general interest:

1. The mean annual rainfall was 1,740.3 mm with very little precipitation in February (18.1 mm), March (65.9 mm), and November (66.6 mm); moderate rainfall in April (139.2 mm), June (140.7 mm) and October (156.0 mm); and no rainfall in January and December. The highest precipitation was recorded in August (342.3 mm).

2. The mean daily minimum temperature varied from 19.7°C in December to 23.8°C in February while the mean maximum temperature ranged from 28.6°C in August to 35.9°C in February. Though the extreme temperatures might be 15°C as in December or 37.8°C in February, yet the average mean daily temperatures were in the range of 25 - 29°C.

3. A greater number of sunshine hours were recorded for January and February (206 - 208 hrs.) while the least for September (49 hrs.).

4. Relative humidity was lowest in February and highest in August, the range being 8% to 95%. Again, it was always the highest at 0700 hours.

5. The area has two distinct seasons: the wet season from April to October, and the dry season from November to March.

METHODS OF STUDY

The study of tree vegetation was carried out by point-centered quarter analysis. A total of 80 points were laid at random in the arboretum of botanical garden. Trees with diameters less than 3 cm were omitted. The objective was to determine the density, dominance and frequency for each tree species. A second objective was to convert these absolute values into relative values. The point-centered quarter method has become well accepted as shown by many vegetation studies (Caplenor, 1968; Newsome and Dix, 1968; Habek, 1968). Mueller-Dombois and Ellenberg (1974) are of the opinion that apart from its less complicated field application and greater information value per sampling point, the method seems more reliable than the random pairs method. Each woody stem was measured in girth at breast height (1.30 m) and the figure was converted to diameter value (DBH). Basal area was computed from DBH.

In quantitative descriptive studies it has become common practice to use the importance value of Curtis and McIntosh (1951).

The study of herbaceous vegetation beneath the trees was done by laying one hundred 50 cm² quadrats. All the species enclosed within the quadrat were recorded and their individuals counted to determine the frequency and density. Cover was determined by stem diameter (Phillips, 1959). These values were computed into relative frequency, relative density and relative cover for the purpose of deriving Importance Value Index.

One obstacle was the difficulty in identifying species as many trees are without reproductive parts at the time of sampling. Fortunately, many trees in the arboretum were labelled while the others could be identified with the help of the Curator and confirmed by Flora of West Africa (Hutchinson & Dalziel,

1954-1972) and the herbarium in the Department of Botany. Those tree species, not included in the sampling points, were enumerated separately and presented as Appendix I.

RESULTS AND DISCUSSION

Table 1 presents the diameter at breast height (DBH), basal area (BA) and Importance Value Index (IVI) of 121 tree species. Based on IVI, the community may be named as *Delonix-Elaeis-Lagerstroemia* community. The sub-dominants are *Lonchocarpus sericeus*, *Peltophorum pterocarpum*, *Bosqueia angolensis*, *Terminalia ivorensis*, *Ficus exasperata*, *Bombax buonopozense* and *Monodora tenuifolia*.

The maximum DBH of 97.1 cm has been recorded for *Azizelia africana*. The trees having DBH ranging from 50 cm to 83 cm include *Berlinia grandiflora*, *Delonix regia*, *Elaeophorbia drupifera*, *Enterolobium cyclocarpum*, *Gmelina arborea*, *Khaya grandifoliola*, *Lannea welwitschii*, *Peltophorum pterocarpum*, *Pterocarpus angolensis*, *Pterygota macrocarpa*, *Pycnanthus angolensis*, *Samanea saman*, *Spathodea campanulata* and *Triplachiton scleroxylon*.

There was not a single species that had more than 9% frequency. However, the highly frequent species were *Delonix regia*, *Elaeis guineensis*, *Lagerstroemia speciosa*, *Antiaris africana*, *Anacardium occidentale*, *Bombax buonopozense*, *Ficus exasperata*, and *Lonchocarpus sericeus*.

The families represented by the greatest number of species were Leguminosae (41 species), Euphorbiaceae (13 species), Bignoniacae (12 species), Sterculiaceae (10 species), and Apocynaceae (10 species). The number of species within brackets includes computation from both Table 1 and Appendix I. However, the families represented by species varying from 3 to 9 were Moraceae, Myrtaceae, Palmae, Anomaceae, Boraginaceae, Bombacaceae, Anacardiaceae, Combretaceae, Sapotaceae, Guttiferaceae, and Verbenaceae in decreasing order of species. There were certain genera represented by more than one species, for example, *Albizia* (3 species), *Bauhinia* (2 species), *Bombax* (2 species), *Cassia* (2 species), *Cola* (2 species), *Cordia* (4 species), *Ficus* (3 species), *Khaya* (2 species), *Lagerstroemia* (2 species), *Millettia* (2 species), *Monodora* (2 species), *Terminalia* (2 species), and *Tabebuia* (2 species).

Table 1 Importance Value Index (IVI) of the tree species in the Botanical Garden of the University of Ibadan, Nigeria.

Names of trees	DBH cm	B.A cm ²	IVI
<i>Acacia senegal</i> (Linn.) Willd.	49.8	1946.83	2.62
<i>Adenanthura pavenina</i> Linn.	47.8	1793.59	1.25
<i>Albizia adianthifolia</i> (Schum.) W.F. Wight	23.9	448.39	1.66
<i>A. regia</i> (DC.) J.F. Macbr.	28.9	655.64	1.79
<i>A. lebbeck</i> (Linn.) Benth.	11.5	103.82	1.16
<i>Alstonia boonei</i> De Wild.	46.2	1675.53	3.67
<i>Azizelia africana</i> Sm.	97.1	7401.30	3.06
<i>Anogeissus leiocarpus</i> (DC.) Guill. & Perr.	39.8	1243.47	3.25
<i>Annona muricata</i> Linn.	5.8	26.41	2.07
<i>A. reticulata</i> Linn.	5.1	20.42	1.38
<i>Antiaris africana</i> Engl.	31.8	793.82	6.24
<i>Anacardium occidentale</i> Linn.	19.5	298.49	4.69

Table 1. (Cont.)

Names of trees	DBH cm	B.A cm ²	IVI
<i>Anthocleista djalonensis</i> A. Chev.	38.2	1145.50	1.04
<i>Artocarpus heterophyllus</i> Lam.	37.9	1127.58	2.09
<i>Astronium urundeuva</i> Engl.	15.9	198.45	0.74
<i>Bouhinia variegata</i> Linn.	11.1	96.72	0.71
<i>B. monandra</i> Kurz	46.3	1682.79	2.45
<i>Bertinia grandiflora</i> (Vahl) Hutch. & Dalz.	76.4	4582.01	2.16
<i>Blighia sapida</i> König	34.9	956.14	3.97
<i>Bombax buonopozense</i> P. Beauv.	28.0	615.44	6.38
<i>B. sessile</i> (Benth.) Pakh.	11.9	111.16	1.44
<i>Bosqueia angolensis</i> Ficalho	47.1	1741.45	7.14
<i>Butea frondosa</i> Roxb.	32.3	818.98	1.89
<i>Butyrospermum paradoxum</i> Subsp. <i>porkii</i> (G. Don) Hepper	22.6	400.95	0.81
<i>Cassia nodosa</i> Buch : Ham, ex Roxb.	35.0	961.62	0.99
<i>C. sieberiana</i> DC.	38.6	1169.61	4.25
<i>Calophyllum inophyllum</i> Linn.	21.6	366.24	2.06
<i>Cela pentandra</i> (Linn.) Gaertn.	34.6	939.77	2.96
<i>Cedrela odorata</i> Linn.	36.7	1057.31	3.07
<i>Chrysobalanus orbicularis</i> Schum.	22.4	393.88	2.43
<i>Chlorophora excelsa</i> (Welw.) Benth.	33.4	875.71	1.92
<i>Cleistopholis patens</i> (Benth.) Engl. & Diels	24.0	452.16	0.82
<i>Citrus reticulata</i> Blance	25.5	510.45	0.84
<i>Cola acuminata</i> Schott & Endl.	11.1	96.72	0.71
<i>C. millenii</i> K. Schum.	28.7	646.59	3.57
<i>Cordia guineensis</i> Schum. & Thonn.	31.6	783.86	0.93
<i>C. nodosa</i> Lam.	36.6	1051.55	1.02
<i>C. platyrrhynsa</i> Bak.	31.8	793.82	0.93
<i>C. sebestena</i> Linn.	6.4	32.15	0.69
<i>Combretum constrictum</i> (Benth.) Laws.	4.5	15.89	1.38
<i>Dalbergia latifolia</i> Roxb.	49.4	1915.68	1.30
<i>Delonix regia</i> (Boj. ex Hook.) Raf.	66.1	3429.83	12.54 *
<i>Dialium guineense</i> Willd.	40.1	1262.28	1.09
<i>Dillenia indica</i> Linn.	28.5	637.62	2.67
<i>Diospyros monbottensis</i> Gürke	12.6	124.62	2.90
<i>Elaeis guineensis</i> Jacq.	33.0	854.86	7.34 **
<i>Elaeophrbia drupifera</i> (Thonn.) Stapf	66.8	3502.85	1.80
<i>Entandrophragma angolense</i> (Welw.) C.D	42.0	1384.74	1.09
<i>Enterolobium cyclocarpum</i> (Jacq.) Griseb.	81.2	5175.85	2.34
<i>Erythrina indica</i> Lam.	37.0	1074.66	3.09
<i>Eucalyptus torrelliana</i> F. Muell.	20.7	336.36	1.58
<i>Eugenia jambos</i> Linn.	30.9	749.52	1.85
<i>Ficus cupensis</i> Thunb.	28.6	642.09	1.78
<i>F. exasperata</i> Vahl	32.6	834.26	6.33
<i>F. mucosa</i> Welw, ex Ficalho	26.5	551.26	1.82
<i>Funtumia elastica</i> (Preuss) Stapf	27.8	606.68	1.76
<i>Garcinia xanthochymus</i> Hook.	28.3	628.69	0.88
<i>Grevillea robusta</i> A. Cunn.	22.3	390.37	0.80

Table 1 (cont.)

Names of trees	DBH cm	B.A cm ²	IVI
<i>Gmelina arborea</i> Roxb.	56.2	2479.37	1.96
<i>Guaiacum ilacae</i> Plum ex L.	25.5	510.45	0.84
<i>Hevea brasiliensis</i> (Kunth) Müll. Arg.	30.6	735.04	0.92
<i>Holarrhena floribunda</i> (G. Don) Dur. & Schinz	34.6	939.77	3.95
<i>Hura crepitans</i> Linn.	31.3	769.05	3.73
<i>Iringia gabonensis</i> (Aubry-Lecomte ex O' Rorke) Baill.	29.3	673.91	1.80
<i>Jacaranda mimosifolia</i> D. Don	18.5	268.66	2.31
<i>Jatropha curcas</i> Linn.	7.9	48.99	0.70
<i>Jaundeia pinnata</i> (P. Beauv.) Schellenb.	25.5	510.44	0.84
<i>Kopsia fruticosa</i> DC.	31.8	193.82	0.93
<i>Khaya grandifoliola</i> C.DC.	50.6	2009.88	1.66
<i>K. senegalensis</i> (Desv.) A. Juss	38.8	1181.77	2.13
<i>Kigelia africana</i> (Lam.) Benth.	31.9	798.82	0.94
<i>Lagerstroemia lanceolata</i> Wight & Arn.	32.2	813.92	0.94
<i>L. spectosa</i> (Linn.) Pers.	33.9	902.12	7.32 ***
<i>Lannea welwitschii</i> (Heim) Engl.	51.3	2065.88	0.75
<i>Lonchocarpus sericeus</i> (Poir.) H.B. & K.	35.2	972.67	7.30
<i>Mangifera indica</i> Linn.	45.5	1625.14	3.62
<i>Malacantha alnifolia</i> (Bak.) Pierre	28.6	642.09	4.12
<i>Melaleuca leucadendron</i> Linn.	48.1	1816.18	1.26
<i>Melia azedarach</i> Linn.	34.7	945.21	1.97
<i>Millettia thonningii</i> (Schum. & Thonn.) Bak.	36.2	1028.69	5.76
<i>M. stuhlmanii</i> Wight. & Arn.	8.6	58.05	0.70
<i>Monodora tenuifolia</i> Benth.	17.4	237.66	6.08
<i>M. myristica</i> (Gaertn.) Dunal	4.8	18.08	0.69
<i>Morinda lucida</i> Benth.	23.9	448.39	2.48
<i>Moringa eleifera</i> Lam.	25.5	510.44	0.84
<i>Myroxylon toluiferum</i> H.B. & K.	40.9	1313.15	2.21
<i>Naucleria latifolia</i> Sm.	15.9	198.45	0.74
<i>Newbouldia laevis</i> (P. Beauv.) Seeman ex Bureau	29.4	678.52	1.81
<i>Ochroma pyramidale</i> (Cav.) Urb.	39.4	1218.60	2.15
<i>Ouratea flava</i> (Schum. & Thonn.) Hutch. & Dalz. ex Stapf	3.2	8.03	0.68
<i>Parkia clappertoniana</i> Keay	25.5	510.45	1.70
<i>Peltophorum pterocarpum</i> (DC.) Backer	66.5	3471.47	7.22
<i>Pentadesma butyracea</i> Sabine	16.6	216.31	0.75
<i>Persea gratissima</i> Gaertn. f.	25.1	494.56	1.69
<i>Polyalthia longifolia</i> var. <i>pendula</i> Hook. f. ex Hook.	22.3	390.37	0.80
<i>Plumeria rubra</i> Linn.	8.9	62.81	0.70
<i>Pterocarpus angolensis</i> DC.	59.2	2751.14	1.56
<i>Pterygota macrocarpa</i> K. Schum.	56.1	2470.56	1.47
<i>Pycnanthus angolensis</i> (Welw.) Warh.	82.9	5394.84	2.42
<i>Psidium guajava</i> Linn.	8.3	54.08	1.48
<i>Rhapis excelsa</i> DC.	30.8	744.68	1.85
<i>Rouvelfia vomitoria</i> Afzel.	22.3	390.37	0.80

Table 1. (Cont.)

Names of trees	DBH cm	B.A cm ²	IVI
<i>Keystenea eleracea</i> O.F. Cook	15.9	198.45	0.74
<i>Ricinodendron heudelotii</i> (Bail.) Pierre ex Pax	45.1	1596.69	2.40
<i>Samanea saman</i> (Jacq.) Merrill	70.1	3857.49	3.85
<i>Spathodea campanulata</i> P. Beauv.	56.3	2488.21	4.45
<i>Spondias mombin</i> Linn.	31.7	788.83	1.88
<i>Sterculia tragacantha</i> Lindl.	24.5	471.19	1.76
<i>Staphanthus sarmeniesus</i> DC.	47.8	1793.59	1.26
<i>Tectona grandis</i> Linn. f.	61.2	2940.17	4.89
<i>Terminalia superba</i> Engl. & Diels	41.5	1351.96	3.36
<i>T. iverensis</i> A. Chev.	20.2	320.31	6.75
<i>Tetrapleura tetraptera</i> (Schum. & Thonn.) Taub.	46.5	1697.37	1.22
<i>Tabeutia pentaphylla</i> Hemsl.	11.8	109.30	1.44
<i>T. resea</i> (Bertel.) DC.	34.9	956.14	3.63
<i>Treculia africana</i> Decne.	48.9	1877.09	3.52
<i>Trichilia heudelotii</i> Planch. ex Oliv.	47.8	1793.59	1.26
<i>Triplochiten scleraxylon</i> K. Schum.	57.3	2577.38	1.61
<i>Vacanga africana</i> Stapf	36.3	1034.38	1.01
<i>Vitex doniana</i> Sweet	44.2	1533.61	3.19

Importance Value Indices of herbaceous vegetation beneath the trees are presented in Table 2. Based on the highest IVI, the community can be recognized as *Tridax-Synedrella-Pennisetum* community. The codominants were *Oplismenus burmannii*, *Panicum maximum*, *Setaria barbata*, *Eupatorium odoratum*, *Eleusine indica*, *Axonopus compressus*, *Calopogonium mucunoides*, *Sida acuta*, and *Euphorbia hetero-*

phylla. The least dominant plant species having IVI less than 1 were *Imperata cylindrica*, *Justicia flava*, *Lindernia crustacea*, *Paullinia pinnata*, *Portulaca oleracea*, *Pouzolzia guineensis*, *Sida rhombifolia*, *Solenostemon monostachyus*, *Spigelia anthelmia*, *Triumfetta rhomboidea* and *Waltheria indica*. The species having highest frequency, density and cover were *Calopogonium mucunoides*, *Axonopus compressus* and *Panicum maximum* respectively.

Table 2. Importance Value Index of herbaceous vegetation in the Botanical Garden of the University of Ibadan, Nigeria.

Names of plants	IVI
<i>Acanthospermum hispidum</i> DC.	4.21
<i>Ageratum conyzoides</i> Linn.	5.10
<i>Alternanthera sessilis</i> (Linn.) R.Br. ex Roth	2.19
<i>Amaranthus viridis</i> Linn.	5.57
<i>Andropogon tectorum</i> Schum. & Thonn.	1.64
<i>Aspilia africana</i> (Pers.) C.D. Adams	3.95
<i>Asystasia gangetica</i> (Linn.) T. Anders	2.09
<i>Axonopus compressus</i> (Sw.) P. Beauv.	14.55

Table 2. (Cont.)

Names of plants	IVI
<i>Berteria ocyroides</i> (Burn. f.) DC.	5.10
<i>Cassia tora</i> Linn.	2.49
<i>Calopogonium mucunoides</i> Desv.	13.43
<i>Centrosema pubescens</i> Benth.	1.32
<i>Cleistanthus trigyna</i> Linn.	0.59
<i>Commelina erecta</i> Linn.	1.46
<i>C. lagosensis</i> C.B. Cl.	4.65
<i>Crotalaria retusa</i> Linn.	5.13
<i>Cyathula prostrata</i> (Linn.) Blume	3.58
<i>Cynodon dactylon</i> (Linn.) Pers.	2.50
<i>Cyperus alternifolius</i> Linn.	5.65
<i>Dactyloctenium aegyptium</i> (Linn.) P. Beauv.	1.31
<i>Digitaria horizontalis</i> Willd.	1.51
<i>Dissotis rotundifolia</i> (Sm.) Triana	1.52
<i>Desmodium hirtum</i> Guill. & Perr.	7.47
<i>Emilia pratermissa</i> Milne-Redhead	0.79
<i>Eleusine indica</i> (Linn.) Gaertn.	15.07
<i>Eragrostis tenella</i> (Linn.) P. Beauv. ex Roem. & Schult.	3.54
<i>Eupatorium odoratum</i> Linn.	15.75
<i>Euphorbia heterophylla</i> Linn.	10.47
<i>E. hirta</i> Linn.	2.99
<i>Fleurya aestuans</i> (Linn.) Miq.	0.52
<i>Indigofera hirsuta</i> Linn.	1.77
<i>Imperata cylindrica</i> (Linn.) P. Beauv.	0.59
<i>Justicia flava</i> (Forsk.) Vahl	0.42
<i>Leucaena glauca</i> (Linn.) Benth.	1.66
<i>Lindernia crustacea</i> (Linn.) F. Muell.	0.42
<i>Mariscus alternifolius</i> Vahl	1.94
<i>Ocotea corymbosa</i> Linn.	5.63
<i>Opismenus burmanni</i> (Retz.) P. Beauv.	18.38
<i>Paricum maximum</i> Jacq.	17.08
<i>Paspalum orbiculare</i> Forst.	1.12
<i>Pennisetum polystachion</i> (Linn.) Schult.	19.90 ***
<i>Peperomia pellucida</i> (Linn.) H.B. & K.	1.05
<i>Paulinia pinnata</i> Linn.	0.30
<i>Phyllanthus amarus</i> Schum. & Thonn.	1.77
<i>Physalis angularata</i> Linn.	3.54
<i>Portulaca oleracea</i> Linn.	0.32
<i>Pouzolzia guineensis</i> Benth.	0.65
<i>Setaria barbata</i> (Linn.) Kunth	16.65
<i>Sida acuta</i> Burn.f.	12.76
<i>S. rhombifolia</i> Linn.	0.49
<i>Solenastemon monostachyus</i> (P. Beauv.) Briq.	0.72
<i>Spigelia anthelmia</i> Linn.	0.79
<i>Sporobolus pyramidalis</i> P. Beauv.	7.92
<i>Synedrella nodiflora</i> Gaertn.	21.60 **
<i>Talinum triangulare</i> (Jacq.) Willd.	3.47
<i>Tridax procumbens</i> Linn.	20.45 *

Table 2. (Cont.)

Names of plants	IVI
<i>Triumfetta rhomboidea</i> Jacq.	0.67
<i>Lrena lobata</i> Linn.	1.17
<i>Waltheria indica</i> Linn.	0.42

Jaccards index of species association (Mueller-Dombois & Ellenberg, 1974) was employed to evaluate the correlation between the species having the highest frequency and other dominant and codominant species through the following formula:

$$IA = \frac{C}{a + b + c} \times 100$$

where, IA = Index of species association

C = Number of quadrats in which the two species occur together.

b = Number of quadrats in which one of the species occurs alone.

c = Number of quadrats in which the other species is found alone.

It is seen that the association index of *Calopogonium mucunoides* and *Sida acuta* is the highest (Table 3).

Table 3. Indices (IA) of species association (%) based on presence of *Calopogonium mucunoides* having the highest frequency with the other species (IVI ranging from 10.47 to 30.45)

Name of Species	IA
<i>Tridax procumbens</i>	11.62
<i>Synedrella nodiflora</i>	20.00
<i>Pennisetum subangustum</i>	21.95
<i>Eupatorium odoratum</i>	13.51
<i>Eleusine indica</i>	12.50
<i>Axonopus compressus</i>	19.23
<i>Sida acuta</i>	33.33
<i>Euphorbia heterophylla</i>	15.78

Strong influences of variations due to climate and soil are absent in the site of study. This is the reason of absence of expression of seasonality effect in the prevailing vegetation, particularly the phanerophytes. However, the herbaceous vegetation is subjected to mowing during the wet season. During the dry season most of the herbaceous plants die.

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Appendix I. Trees of the Botanical Garden, University of Ibadan, Nigeria not recorded in the Point-Centred Quarter Analysis

1. *Aningeria robusta* (A. Chev.) Aubrév. & Pellegr.
3. *Bridelia micrantha* Baill.
5. *Bauhinia galpinii* N.E. Br.
7. *B. tomentosa* Linn.
9. *Caesalpinia ferrea* Mart.
11. *Cassia siamea* Lam.
13. *C. fistula* Linn.
15. *C. auriculata* Linn.
17. *Casuarina equisetifolia* Linn.
19. *Cedrela mexicana* M. Roem.
21. *Citrus paradisi* Macfad.
23. *Cocos nucifera* Linn.
25. *Cussonia hartei* Seem.
27. *Erythrina mildbraedii* Harms
29. *Eucalyptus alba* Reinw. ex Blume
31. *Euphorbia kamerunica* Pax
33. *Hildegardia hartei* (Mast.) Kosterm.
35. *Lecaniodiscus cupanioides* Planch.
37. *Morus mesozygia* Stapf
39. *Pentaclethra macrophylla* Benth.
41. *Phyllanthus discoideus* (Baill.) Müll. Arg.
43. *Pterocarpus osun* Craib
45. *Roystonea regia* H.B. & K.
47. *Tecoma stans* (Linn.) H.B.K.
49. *Terminalia catappa* Linn.
51. *Uapaca staudtii* Pax
2. *Averrhoa carambola* Linn.
4. *Brachystegia eurycoma* Harms
6. *B. rufescens* Lam.
8. *Byrsocarpus coccineus* Schum. & Thonn
10. *Canarium schweinfurthii* Engl.
12. *C. spectabilis* DC.
14. *C. alata* Linn.
16. *Crescentia cujete* Linn.
18. *Cryptostegia grandiflora* (Roxb.) R.Br. ex Lindley
20. *Cinnamomum zeylanicum* Nees
22. *Cordia alliodora* Cham.
24. *Cnestis ferruginea* DC.
26. *Dichrostachys cinerea* (Linn.) Wight & Arn.
28. *E. excelsa* Baker
30. *E. saligna* Sm.
32. *Fagara rubescens* (Planch. ex Hook. f.) Engl.
34. *Kleinhovia hospita* Linn.
36. *Maesopsis eminii* Engl.
38. *Oroxylon indicum* (Linn.) Kurz
40. *Parmentiera cereifera* Seem.
42. *Pinus caribaea* Morelet
44. *Ravenala madagascariensis* soun.
46. *Thevetia peruviana* (Pers.) Merr.
48. *Tecomaria capensis* (Thunb.) Spach.
50. *Turraea vogelii* Hook. f. ex Benth.
52. *Xylopia aethiopica* (Dunal) A. Rich.

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