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Summate stock list of Plant Habits of Spermatophytic flora on the Landmass of the Federal College of Forestry Jos, Plateau State.

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----------ABSTRACT----------
This research work was carried out to ascertain the distribution of angiosperm habits in the affirmed landmass of Federal College of forestry, Jos. Point were generated systematically with global positioning system (GPS) the model used was QGIS. 50 plots of 10m X 10m plot size were established for the counting of woody plant species. Each plot size has a distance of 50 meters from the next plot size. While 1m X1m quadrat size was thrown randomly to estimate the numbers of grasses and herbs. Soft-ware' R-Statistics(version 3.2.3, R development core team 2015) was used to determine significant differences across various spermatophytic species. Shannon wiener index was used to calculate species diversity. Species cumulative curve shows continues extension as sample plot increase (x-axis) number of species also increases (y-axis) in the 50 plots sampled. A total 3470 individual belonging to 107 species was sampled in 46 families. While a total 5,342 individuals belonging to 70 species of 22 families with 33 grasses and herbs. This observation is in agreement with the findings that noted that Poaceae is the most dominant grass family in grassland vegetation, that is numerous species recorded suggested the normal distribution of plant species with more grasses followed by the shrubs and lastly the trees within the study area. Further study could be carried out on non-vascular plant species and aquatic macrophytes of Federal College of Forestry, Jos so as to document both micro and macro plant species.

KEYWORDS: *Plant diversity, plant habits, spermatophytic floral, landmass, Federal College of Forestry, Jos.*

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I. INTRODUCTION

Biological diversity describes the variety and population of all life forms in a given place such as plants, animals, bacteria, viruses, fungi etc. It also describes the structures and functions that sustain this variety and allow it to adapt to changing environmental circumstances. Biodiversity is rapidly declining worldwide and there is a consensus that this can decrease ecosystem function and service (Brown *et al.,* 2012).

Flora is a plant life occurring in particular region or time, generally the occurring or indigenous native plant life **(**Clifford,2002). Plants are grouped into floras based on region (floristic regions), period, special environment, or climate. Floras can mean plant life of a historic era as in fossil flora and may be subdivided by special environments (Martins *et al.,* 2011).

Different species promote ecosystem functioning during the years, at different places for different function and under different environmental changes scenarios (Craine*et al.,* 2003). Plant diversity is an overlap in resource requirement between species in a functional group (Belaoussoff, 2003). Species diversity is the number of different species in a particular area weighted by some measure of abundance such as number of individuals or biomass (Harrison *et al.,* 2004).

This research work is study the plant diversity in terms of abundance and richness of spermatophytic flora in Federal College of Forestry, Jos.

II. MATERIALS AND METHODS

Federal college of forestry, Jos is located in Jos North with an area of 291 km^2 and population of 429,300 at the 2006 census (NIPOST 2009). Jos north is located in North West of plateau state, latitude 7^0 and 11^0 North and longitude 7^0 and 25^0 east and south of latitude of about 1.200m above sea level. The area lies between southern limited of Sudan savanna and the Northern of Guinea Savanna ecological zone, with total population of 429,300 (NPC, 2009) with total area of 291 km^2. Jos has total rainfall of 1500mm with average temperature of 18^0-25^0c (Anonymous, 2000.)

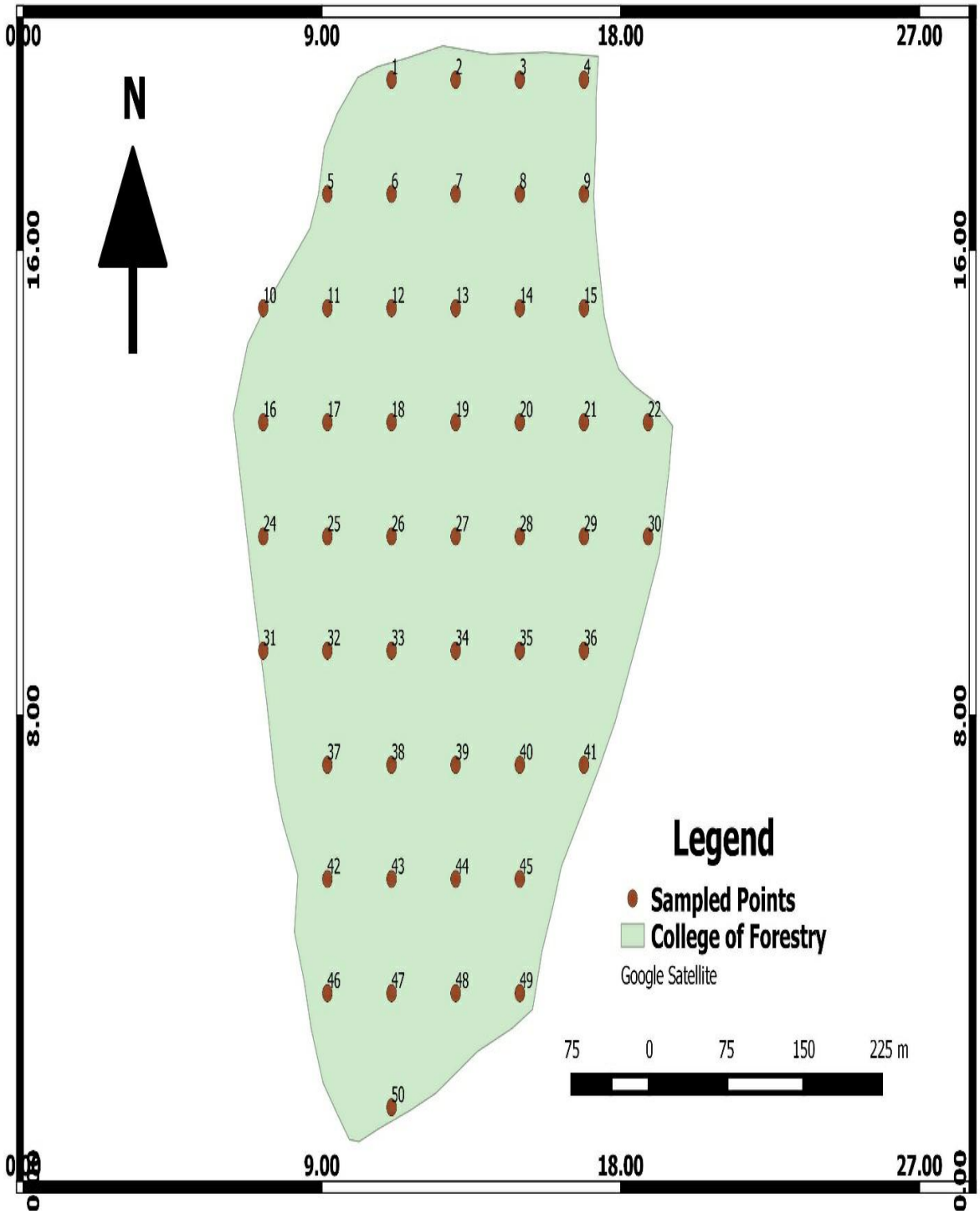

Figure 1: Map of Federal College of Forestry Jos showing the sample points.

III. METHOD

Points were generated systematically with global positioning system GPS using (quantum geographical information system) (QGIS). 50 plots of 10m x 10m were established based on point with the distance of 50 m from one plot to another. 10 m x 10 m was marked out for direct counting of woody species and 1m x 1m quadrat was thrown randomly for estimating the percentage of grasses and herbs. Identification was carried out using relevant tree guide such as handbook of West African weed and tree, Shrubs and Lianas of West African dry zones. Other plants not identified in the field were collected plant press for further authentication at Forestry Herbarium Ibadan FHI and Prof. Emmanuel Aigbokan in Edo state

Vegetation sampling

Identification was carried out using relevant tree guide such as handbook of West African weed and tree, Shrubs and Lianas of West African dry zones. Other plants not identified in the field were collected plant press for further authentication at Forestry Herbarium Ibadan FHI and Prof. Emmanuel Aigbokan in Edo state

Method of Data Analysis

Soft-ware' R-Statistics(version 3.2.3, R development core team 2015) was used to determine significant differences across various spermatophytic species. Shannon wiener index was used to calculate species diversity of spermatophytic species in Federal College of Forestry, Jos. Diversity index (H^1) = $^{-\sum p-\sum p}$ [Ln (p^1)].

IV. RESULTS

Species cumulative curve shows continues extension (figure 1) as sample plot increase (x-axis) number of species also increases (y-axis) in the 50 plots sampled. A total 3470 individual belonging to 107 species was sampled in 46 families. While a total 5,342 individuals belonging to 70 species of 22 families with 33 grasses and herbs.

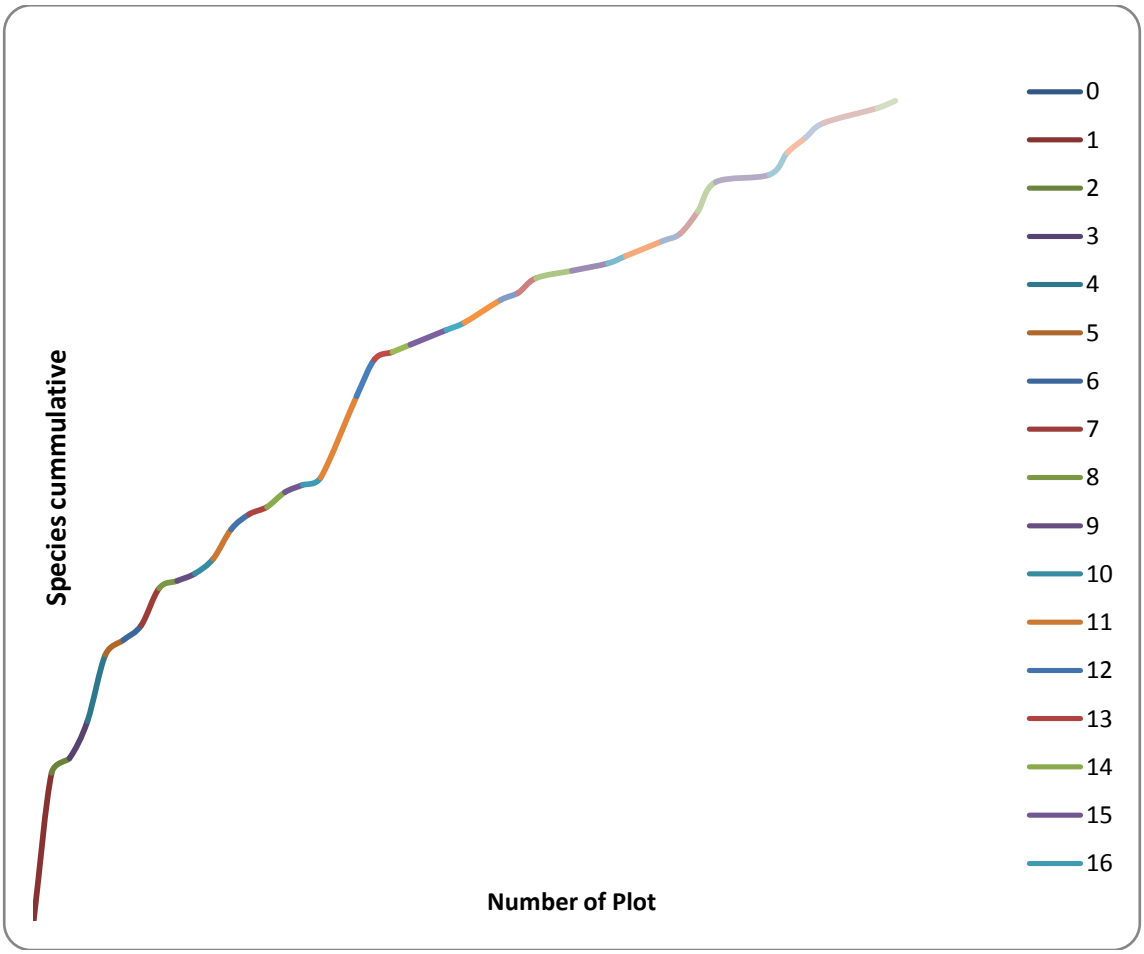

Figure 1: Graph showing Species cumulative curve

Table1: Comparative diversity of Woody and Herbaceous species

	Woody plants	Herbs
Total	10	772
Shannon wiener Diversity	3.67	3.60

Shannon wiener Diversity index of Woody Plant is 3.67 while the diversity of herbs was 3.60.

$$H = -\sum_{i=1}^{s} p_i \ln p_i$$

Table 2: Percent variable cover and occurrence

Grass	Herbs	Woody plant	Bare ground
42.29	34.7	12.81	10.2

Table 2 shows that grasses are more abundant 42.29%, followed by herbs 34.7% then woody plant 12.81% and bare ground 10. 2%

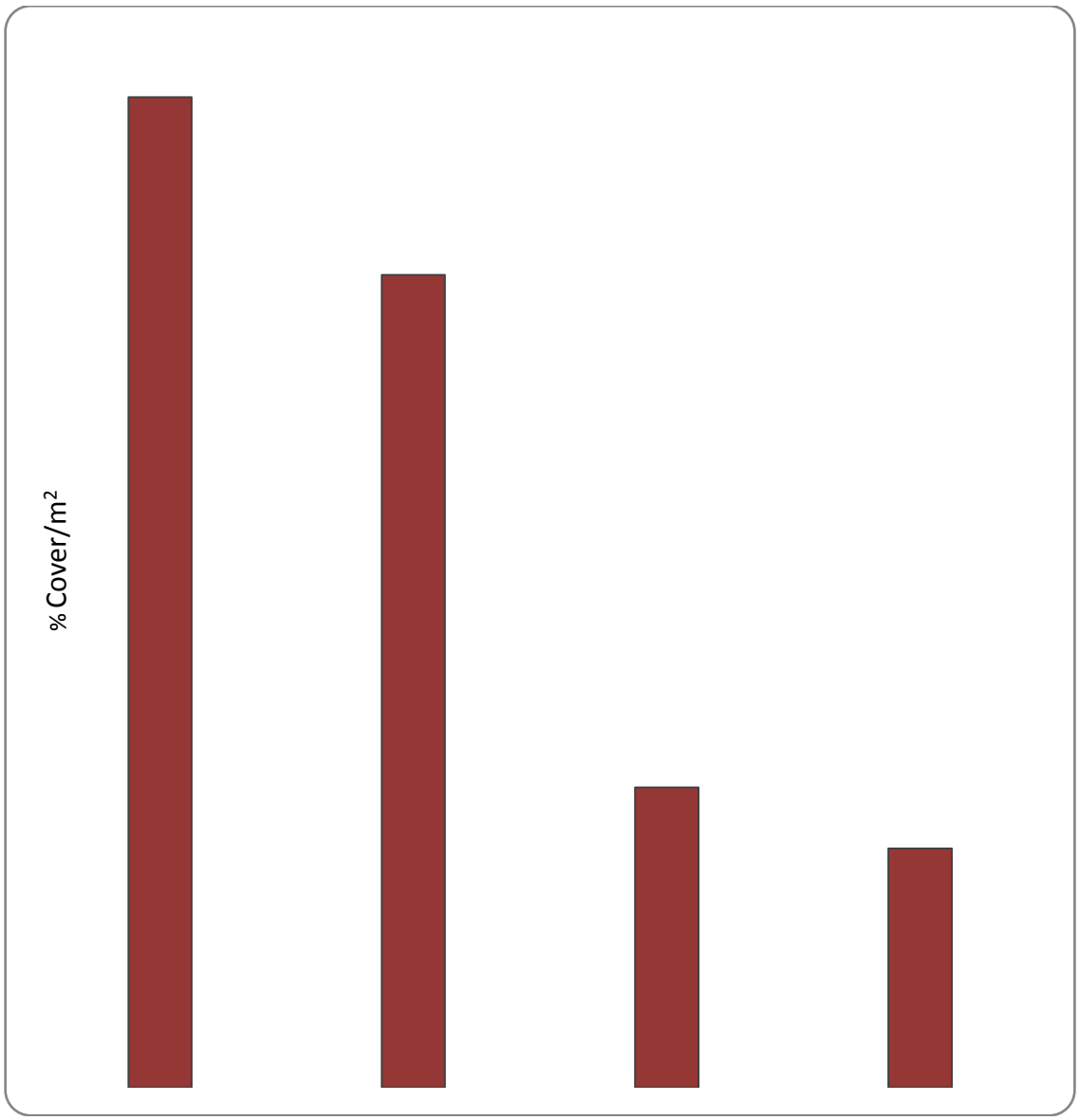

Figure 2: Bar graph of Percent variable cover and occurrence

Frequency of plant = (Number of plants in plot/ total number of plot sampled) 100. While bare ground was estimated at 10% equals 1 cm of the total area of 1x1 m quadrat.

Table 3: Shows the families and names of Woody Species collected

S/N	Family	Species
1	Euphorbiaceae	*Acalyphawilkesiana* 'Moorea'Mull. Arg.
2	Euphorbiaceae	*Acalyptagodseffiana* 'Iferno'Mast
3	Passifloraceae	*Adeniacissampeloides*(Planch) Harms
4	Mimosoideae	*Albiziazygia (DC.)*JF Macbride
5	Euphorbiaceae	*Alchorneacordifolia*Mull. Arg
6	Sapindaceae	*Allophalusafricana*(P Beauv.)
7	Apocyanceae	*Ancylobotrysamoena*Hua
8	Vitaceae	*Anipelocissusanpelocissus*Planch
9	Annonaceae	*Annona senegalensis*Pers
10	Combretaceae	*Anogeissusleiocarpa* (DC) Guill& per
11	Papilionioideae	*Bauhinia variegate* (L) Benth.
12	Melianthaceae	*Bersamaabyssinica*Fresen.
13	Bombacaceae	*Bombaxcostatum*Pellegr&Vuilt
14	Nyctaginaceae	*Bougainvillea glabra*Choisy
15	Rubiaceae	*Breonadiasalicina*(Vahl) Hepper&J.R.l.Wood
16	Caesalpinoideae	*Caesalpiniapulcherrima*(L) Sw.
17	Caricaceae	*Carica papaya* L.
18	Apocyanceae	*Carissa edulis*Vahl
19	Apocyanceae	*Cascabelathevetia*(L) Lippold
20	Lauraceae	*Cassyth*filiformis L.
21	Vitaceae	*Cissusaraliodes* (Welw) Planch.
22	Vitaceae	*Cissus spp* L.
23	Rutaceae	*Citrus lemon (L.)* Osbeck
24	Rutaceae	*Clausesaanistata*(Willd) hook.f ex Benth
25	Rubiaceae	*Clerodendrumcapitatum* (Willd) Schum&Thornn
26	Combretaceae	*Combretumnigrican*Lepr. ex Guill
27	Myrtaceae	*Corymbiatorelliana*(F.Muell.) K.D Hill & L.A.S Johnson
28	Euphorbiaceae	*Croton macrostachyus*Hochst. ex Delile
29	Cucubitaceae	*Cucumismetuliferus*E. Mey
30	Araliaceae	*Cussoniaarborea*Hochst.
31	Caesalpinoideae	*Delonixregia*(Boj. ex Hook) Raf.
32	Papilionioideae	*Desmodiumvelutinum*(Willd) DC.
33	Caesalpinoideae	*Dialiumguineense* Willd
34	Mimosoideae	*Dichrostacthyscinerea*Wight et Arn.
35	Ebenaceae	*Diospyrosbuxiflora*(Blume) Hiern.
36	Ebenaceae	*Diospyros spp* L.
37	Sapindaceae	*Dodonaeaviscosa*Jacq.
38	Lamiaceae	*Duranta repens* L.
39	Meliaceae	*Ekebergiasenegalensis*A.Juss.
40	Arecaceae	*Elaeisguineensis*Jacq.
41	Papilionioideae	*Erythrinasenegalensis*DC.
42	Myrtaceae	*Eucalyptus camaldulensis Dehnh*
43	Moraceae	*Ficusglumosa* Delile

4	4	Moraceae	*Ficuscitrifolia* Mill 1768
4	5	Moraceae	*Ficus coronate* Spin
4	6	Moraceae	*Ficusingens* (Miq.) Miq 1867
4	7	Moraceae	*Ficusovata* Var.octomelifolia
4	8	Moraceae	*Ficus sur* Forssk. 1775
4	9	Salicaceae	*Flacourtiaspp* (Burm.f.) Merr.
5	0	Caesalpinoideae	*Gliricidiasepium* (Jacq.) Kunth ex Walp.
5	1	Lamiaceae	*Gmelinaarborea* Roxb.
5	2	Hymenocardiaceae	*Hymenocardia* acida Tul.
5	3	Convulvolaceae	*Ipomoea hederifolia* L.
5	4	Convulvolaceae	*Ipomoea* spp L.
5	5	Bignoniaceae	*Jacaranda mimosifolia* D.Don
5	6	Oleaceae	*Jasminum* dichotomum Vahl.
5	7	Oleaceae	*Jasminumpauciflorum* Benth
5	8	Euphorbiaceae	*Jatropha curcas* L.
5	9	Meliaceae	*Khayasenegalensis* (Desr) A.Juss
6	0	Verbenaceae	*Lantana camara* L.
6	1	Mimosoideae	*Leucaenaleucocephala* (Lam.) de wit
6	2	Rubiaceae	*Macrosphyralongistyla* (DC) Hook.f.
6	3	Anacardiaceae	*Mangifera indica* L.
6	4	Saponitaceae	*Manilkaramultinervis* (Baker) Dubard
6	5	Chrysobalanaceae	*Marantheesspp* Blume
6	6	Phyllanthaceae	*Margaritariadiscoidea (Baill)* G.L Webster
6	7	Rubiaceae	*Miliciaexcelsa (*Welw.) C.C Berg
6	8	Nyctaginaceae	*Mirabilis jalapa* L.
6	9	Cucubitaceae	*Momordicacharantia* var. muricata (Willd) H.L Chakraverty
7	0	Papilionioideae	*Mucunapoggei* Taub..
7	1	Musaceae	*Musa sapientum* ‘ L.
7	2	Ochnaceae	*Ochnaschweinfurthiana* Hoffm.
7	3	Ochnaceae	*Ochnaserulata* (Hochst) Walp.
7	4	Verbenaceae	*Ocimumgratissimum* L.
7	5	Olacaceae	*Olaxsubscorpioides* Oliv.
7	6	Oleaceae	*Oleacapiensis* L.
7	7	Poaceae	*Oxytenantheraabyssinica* (A.Rich) Munro
7	8	Rubiaceae	*Pavettaspp* L.
7	9	Arecaceae	*Phoenix reclinata* Jacq.
8	0	Pinaceae	*Pinuscaribaea* Morelet.
8	1	Myrtaceae	*Psidiumguajava* L.
8	2	Rubiaceae	*Psychotriapsychotriodes* (DC) Roberty
8	3	Rubiaceae	*Psychotriaspp* L.
8	4	Papilionioideae	*Pterocarpuserinaceus* Poir.
8	5	Euphorbiaceae	*Ricinuscummunis* L.
8	6	Rubiaceae	*Rytigyniasenegalensis* Blume
8	7	Apocyanceae	*Saba senegalensis* (A.D.C) Pichon
8	8	Connaraceae	*Santaloidesafzelii* Schellenberg

8	9	Rubiaceae	*Sarcocephaluslatifolius*(JE Sm.) EA Bruce
9	0	Caesalpinoideae	*Senna singueana*(Delile) Lock
9	1	Papilionioideae	*Sesbaniasesban*(L.) Merr.
9	2	Bignoniaceae	*Spathodeacompanulata*P.Beauv.
9	3	Apiaceae	*Steganotaeniaaraliacea*Hochest.
9	4	Loganiaceae	*Strychnos floribunda* Gilg
9	5	Myrtaceae	*Syzygiumguineense*(Willd) DC. Var. guineense
9	6	Myrtaceae	*Syzygiumguineense*Subsp. Macrocarpum(Engl) F. White
9	7	Bignoniaceae	*Tecomastans*(L.)Juss. ex kunth
9	8	Lamiaceae	*Tectonagrandis* L. F
9	9	Combretaceae	*Terminalia mantaly*H. Perrier
1 0	0	Cupressaceae	*ThujaplicataDonn*ex. D.Don
1 0	1	Rubiaceae	*Tricalysiaelliotii*K. schum
1 0	2	Annonaceae	*Uvariachamae*P. Beauv.
1 0	3	Rubiaceae	*Vachelliasieberiana var. sieberiana*(DC) Kyal&Boatwr.
1 0	4	Astaraceae	*Vernoniaamygdalina*Delile
1 0	5	Lamiaceae	*Vitexdonianavitex*(Sweet)
1 0	6	Lamiaceae	*Vitexmgrandifolia*Gurke
1 0	7	Rhamnaceae	*Ziziphusabyssinica*Hochst ex. A. Rich

Table 3 shows that the family Anacardiaceae has the abundance followed by Vitaceae and Apocyanceae of the woody species. A total of 3470 individual belonging to 107 species were sampled in 46 families. In all, the family Anacardiaceae was dominant with 1 genera and 19 species. This was followed by Vitaceae and Apocynaceae (3 genera, 3 species each). Apocynaceae with 4 genera and 4 species while Vitaceae has 3 genera with 3 species respectively.

Table 4: Shows the families and abundance of herbaceous species

S/N	Family	Species
1	Amaranthaceae	*Achyranthesaspera*L.
2	Amaranthaceae	*Alternantherasessilis*(L.) R. Br. Ex DC
3	Asteraceae	*Ageratum conyzoides*Linn.
4	Amaranthaceae	*Amaranthus spp*
5	Acanthaceae	*Asystasiagangetica*(L.) T. Anderson
6	Asteraceae	*Bidenspilosa*L.
7	Asteraceae	*Bidensbiternata*(Lour.) Merr. &Sherff
8	Oxalidaceae	*Biophytumsensitivum*(L.) DC.
9	Rubiaceae	*Borreriastachydea*(DC.) Hutch. & Da/ziel
1 0	Papilionioideae	*Calopogoniummuconoides*Desv.
1 1	Amaranthaceae	*Celosia spp*L.
1 2	Apoiaceae	*Centellaasiatica*(L.) Urban
1 3	Asteraceae	*Chromolaenaodorata*(L.) R.M. King & H. Rob.
1 4	Asteraceae	*Chrysanthellum Americana* Vatke
1 5	Vitaceae	*Cissus coryfolia*
1 6	Malvaceae	*Cochorusolitorius*L.
1 7	Commelinaceae	*Commelinabenghalensis*L.
1 8	Commelinaceae	*Commelinasubulata*Roth
1 9	Asteraceae	*Conyzaaegyptiaca*(L.) Dryand

2	0	Asteraceae	*Cosmos sulphureus* Cav.
2	2	Asteraceae	*Crassocephalumcrepidioide*(Benth.) S. Moor 1912
2	3	Amaryllidaceae	*Crinum buphanoides* Welw. Ex Baker
2	4	Papilionioideae	*Crotalaria juncea* L.
2	5	Papilionioideae	*Desmodiumscorpiurus*(Sw.) Desv.
2	6	Papilionioideae	*Desmodium spp* Desv.
2	7	Papilionioideae	*Desmodiumtriflorum*(L.) DC.
2	8	Asteraceae	*Drymariacordata*(L.) Wild.exRoem&Schult
2	9	Asteraceae	*Emilia coccinea*(Sims) G. Don
3	0	Euphorbiaceae	*Euphorbia graminea* Jacq.
3	1	Euphorbiaceae	*Euphorbia heterophylla* L.
3	2	Euphorbiaceae	*Euphorbia hirta* L.
3	3	Asteraceae	*Galinsogaparviflora* Car. 1796
3	4	Asteraceae	*Guizotiaspp* Cass. 1829
3	5	Acanthaceae	*Hygrophilaauriculata* Schumach
3	6	Acanthaceae	*Hypoestesphyllostachya* Baker 1887
3	7	Papilionioideae	*Indigoferahirsuta* Linn.
3	8	Papilionioideae	*Indigoferanummularifolia (L.)* Livera ex. Alston
3	9	Convulvolaceae	*Ipomoea eriocarpa* R. Br.
4	0	Asteraceae	*Lactucapulchella*(Pursh). DC.
4	1	Asteraceae	*Laggeraalata*(D.Don) Sch.
4	2	Urticaceae	*Laporteaestuans*(L.) Chew
4	3	Lamiaceae	*Leucasmartinicensis*(Jacq.) R.Br.
4	4	Scrophulariaceae	*Linderniacrustacea*(L.) F.Muell.
4	5	Onagraceae	*Ludwigiadecurrens*(Walter)
4	6	Cyperaceae	*Mariscusalternifolius* Rottb, 1772
4	7	Nyctaginaceae	*Mirabilis jalapa* L.
4	8	Rubiaceae	*Oldelandiacorymbosa* L.
4	9	Oxalidaceae	*Oxalis stricta* L.
5	0	Phyllanthaceae	*Phyllanthusniruri* L.
5	1	Solanaceae	*Physalis spp* L.
5	2	Verbenaceae	*Platostomaafricanum* Beauv.
5	3	Rubiaceae	*Richardiabrasiliensis* Games
5	4	Amaranthaceae	*Scorpariadulcis* L.
5	5	Malvaceae	*Sidaacuta* Burm.f.
5	6	Malvaceae	*Sidacorymbosa* RE Fries
5	7	Malvaceae	*Sidagarckeana* Pol.
5	8	Malvaceae	*Sidarhombifolia L.*
5	9	Malvaceae	*Sidaurens* Linn.
6	0	Solanaceae	*Solanumnigrum* L.
6	1	Rubiaceae	*Spermacocesigmoidea* Burm. F
6	2	Papilionioideae	*Stylosantheshumilis* Kunth.
6	3	Asteraceae	*Synedrellanodiflora*(L.) Gaertn.
6	4	Asteraceae	*Tithoniadiversifolia (*Hemsl.) A.Gray
6	5	Asteraceae	*Tridexprocubens* L.

6	6	Malvaceae	*Urenalobata* L.
6	7	Asteraceae	*Vernoniaambigua* Kotschy & Peyr
6	8	Asteraceae	*Vernoniacinerea* (Linn.) Less.
6	9	Asteraceae	*Zinnia elegans* Jacq. 1793
7	0	Papilionioideae	*Zorniahebecarpa* Mohlenbr.

Table 4 shows that the family of Asteraceae has the highest abundance followed by Amaranthaceae and Rubiaceae. A total of 5342 herbaceous individual belonging to 70 species of 22fa families. In all the families Astaraceae was dominant with 19 genera and 19 species respectively, this was followed by Amaranthaceae (5 genera, 5 species), Rubiaceae (4 genera and 4 species), respectively.

Table 5: Shows the abundance of Percentage of grasses

S / N	Species
1	*Andropogongayanus* kunth
2	*Axonopuscompressus* (SW.) P. Beauv.
3	*Brachiariadeflexa (Schumach.)* C. E. Hubbb. Ex Robyns
4	*Chloris pilosa* Schumach.
5	*Commelinabenghalensis* L.
6	*Cynodondactylon* (L.) Pers.
7	*Cyperusaspan* L.
8	*Cyperusspp* (L.)
9	*Dactyloctenіumaegyptium* (L.) Willd
10	*Digitariagayana* (Kunth) A. Chev. ex. Stapf
11	*Eleusineindica (L.) Gaertn.*
12	*Eragrostisspp* Wolf
13	*Eragrostistenella (Linn.)* P Beauv.
14	*Eragtostisantrovirens* (Desf.) Trin. ex steud.
15	*Fimbristylisferruginea* (L.) Vahl
16	*Kyllingabulbosa* P. Beauv.
17	*Kyllingaerecta* Sschumach
18	*Kyllingaspp* Rottb.
19	*Kyllingasquamulata* Thonningese ex Vahl
	Megathyrsusmaximus (Jacq.) B. K. Simon & S. W. L. *Jacobs , 2003*
20	*Rottboelliacochinchinensis* (Lour.) W. D
22	*Paspalumcanjugatum* Berg.
23	*Paspalumgerminatum* (Forssk.) Stapf
24	*Paspalumorbiculare G.* Forst.
25	*Paspalumscrobiculatum* L.
26	*Paspalumspp* L.
27	*Paspalumvaginatum* Sw.
28	*Pycreuslanceolatus* (Poir.) C. B. Clarke
29	*Melinisrepens* (Willd). Zizka
30	*Scleria* spp P. J. Bergius
31	*Setariabarbata* (Lam.) Kunth
32	*Setariapumila* (Poir.) Roem. & Schult
33	*Sporoboluspyramidalis* Beauv.

Table 5 shows that the species *Dactylocteniumaegyptaum* has the highest abundance followed by *Kyllingasquamulata* and *Eragrostis* species. *Dactylocteniumaegyptium*was the most occurring species with 7.5%, followed by *Eragrostispp*with 6.25% while *Kyllingasquamulata*has 6.5%.

V. DISCUSSION

This finding is not in agreement with the determinations of Asase and Yeboah (2007) and Asase*et al.,* (2009) who noted that the Fabaceae, Combretaceae were dominant tree families in the Guinea savanna vegetation. Plots located along the riparian forest have higher number of woody plant with less grasses and herbs due to thick canopy structure which prevents grasses and herbs from having access to sunlight thus, reducing their abundance in such locations. This observation is not in agreement with the findings of Patrice *et al.,* (2007) who noted that riparian forest is the least diverse (33) in woody plants.

This implies that the environment studied is more diverse in grasses and herbs while woody plant species are rarely found on such plot. Other plots are bare ground (1m x 1m) which for grasses and herbs, cultivated farm land are mostly dominated by grasses and herbs because farming activities encourage the growth of such species (herbs and grasses). In terms of species abundance this observation is in agreement with the research findings of (Hubbell, 2001., McGill *et al.,* 2007) who noted that relative species abundance refers to how common or rare a species is relatively to other species in a given location or community.
This observation is in agreement with the findings of Molla*et al.,* (2017) who noted that Poaceae is the most dominant grass family in grassland vegetation.

VI. CONCLUSION

This study has clearly shown a spread of spermatophytic plant diversity. The numerous species recorded suggested the normal distribution of plant species with more grasses followed by the shrub and lastly the trees within the study area. It also called for a close monitoring of the studied ecosystem by the appropriate authorities to checkmate the anthropogenic activities that could contribute to species loss.

VII. RECOMMENDATIONS

Therefore, further study need to be done on non vascular plant species and aquatic macrophytes of Federal College of Forestry, Jos so as to document both micro and macro plant species.

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