

Flora Resources and Structure in Pandam Wildlife Park, Pandam, Plateau State, Nigeria

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Abstract: This study aimed at providing information on the species list and structure of flora resources in Pandam Wildlife Park. To achieve this, both plot and plotless methods for vegetation analysis were used. Girth at breast height was measured with diameter tape at 1.4 m above the ground and before the first branching. Height was measured by the angular pace method while crown area was determined from two perpendicular distances of tree canopy. Results obtained showed that there were 152 species of vascular plants belonging to 52 families. Frequency of species occurrence in the families ranged from 4.62% in Cyperaceae to 14.52% in Poaceae. Most of the trees were in the $0 \geq 50$ cm girth class category irrespective of the vegetation type. The *Burkea* woodland recorded the highest percentage of trees in the height class of $0 \geq 10$ m while, the Riparian forest recorded the highest percentage of trees in the height class ≥ 20 m. Crown cover ranged from 3754.30 m ha⁻¹ in *Burkea* woodland to 9488.16 m ha⁻¹ in the Riparian forest.

Key words: Species list, structure, flora resources, vegetation

INTRODUCTION

Tropical Forest and Woodland destruction has recently aroused considerable international concern and has become the focus of several major international conservation programmes. One of the reasons for this growing concern over the future of the world's tropical forest and woodland lies in their value as home to the greatest wealth of life forms to be found anywhere on earth. It is estimated that between 2 and 4 million of the earth's 5-10 million species live in the tropical forest and woodlands (Usher, 1991).

The destruction of tropical forests and woodlands through industrial and agricultural expansion including the proliferation of dams, over-grazing, over exploitation of land resources, frequent burning of vegetation, indiscriminate hunting of wild animals and the use of poisonous chemicals for fishing have set in motion a chain of changes which make it extremely difficult to protect the ecosystem. This situation informed the emphasis on in-situ conservation programmes such as forest reserves, wildlife parks and nature reserves as the most practical way of conserving what is left of our renewable natural resources (Federal Department of Forestry, 1985).

Plateau State has two wildlife parks, one in Jos and the other in Pandam. The two conservation areas are

imageries of themselves as there are no management plan and no baseline information on the biological resources component (personal communication with the management). Sustainability of the fauna resources in the park depends on how much of the flora resources of the park that can be conserved. This implies that the information on species list and structure of flora resources of the park must be ascertained for the purpose of developing relevant management plan and ecological monitoring system that will ensure the conservation of both the flora and the fauna that depend on them. Hence, the commencement of this study which aimed at providing a comprehensive list of flora resources as well as the floristic structure according to vegetation types in the park.

MATERIALS AND METHODS

The study area: Pandam Wildlife Park is located south of Plateau State and lies between Latitudes 8°35'N and 8°55'N and Longitudes 8°00'E and 10°00'E. It is bounded on the east by Namu and Kayarda towns, on the West and North by the Dep River and on the south by Aningo and Pandam towns. Monthly mean temperature range from 25.8°C in August to 35.7°C in March. The wet season extends from December to March. Mean monthly rainfall range from 0.00- 243.5 cm (LBRB, 1982). The entire park

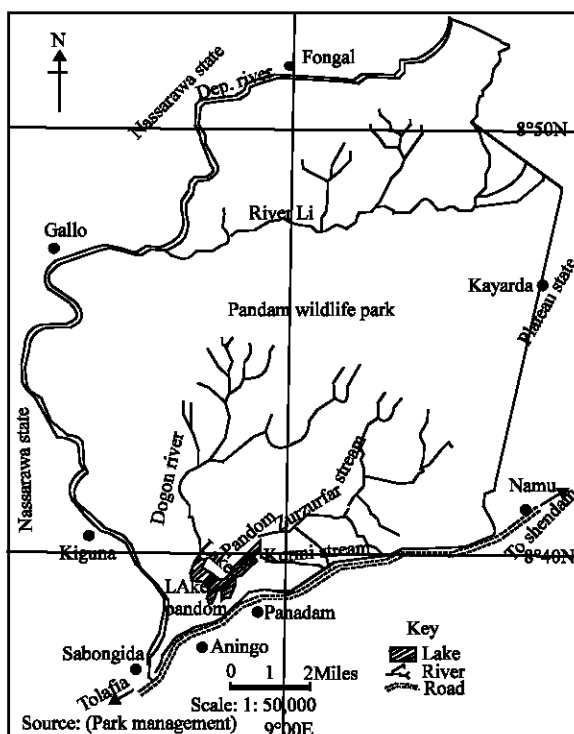


Fig. 1: Sketch map of pandam wildlife park

Lies within the northern guinea savanna. The vegetation of the park is classified into Daniellia-Vitellaria Association, *Burkea* woodland, Detarium-woodland, *Isobrerlinia* woodland, Riparian forest and the Grassland floodplain (Fig. 1 and 2).

Data collection techniques

Inventory of flora species and analysis of vegetation structure:

Three sampling plots (100×50 m each) were established in each vegetation type according to the method of Kershaw (1979). First, in each plot, total enumeration of woody plant species was carried out. Secondly, the girth at breast height, height and crown cover of those woody plants that were 10 cm and above at breast height were measured.

The girth at breast height was measured according to the method of Gysel and Lyon (1980). Height was measured by the angular pace method (Rodman, 1978) while crown cover, was determined by obtaining 2 diameter measurements, running perpendicular to each other from which the crown cover was calculated using the formula: $D_1 \times D_2 \times 0.7854$ (Gysel and Lyon, 1980).

Apart from woody plants, herbaceous plant composition was also determined but this was from five sampling plots (20×50m) established in each vegetation type. The method employed followed that of Sutherland (1999). In this method one herbaceous plant species was

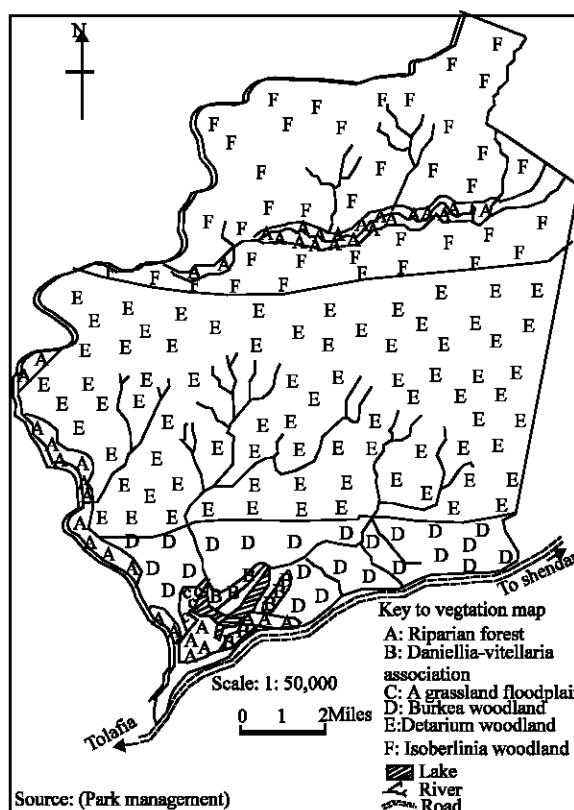


Fig. 2: Sketch map of the vegetative cover of pandam wildlife park (Map units based on the work of the author)

recorded at 1m interval along the 50m length of the sampling plot. Plant species that did not occur in the plots but were encountered in the park were also identified and included in the species list. All plants were identified to the species level except in few cases where herbarium samples had to be prepared and identified at the herbarium of Forestry Research Institute, Ibadan.

RESULTS

Flora species composition in pandam wildlife park:

Woody and nonwoody plant species in Pandam Wildlife Park according to vegetation types are shown in Table 1. One hundred and fifty-two species were listed in all. Out of these, the Riparian forest contained 45, Daniellia-Vitellaria association 42, *Burkea* Woodland 70, Detarium woodland 63, *Isobrerlinia* woodland 67, Floodplain 34 and the Lakeshore 14. These species belong to 52 families with the highest frequency of occurrence in the Poaceae (14.52%), Rubiaceae (6.60%), Caesalpiniaceae, (5.94%), Combretaceae (5.28%), Mimosaceae (5.28%), Cyperaceae (4.62%) and Papilionaceae (3.96%) (Table 2).

Table 1: Checklist of vascular plants of pandam wildlife park

Taxa/scientific name	Habitat types						
	RF	DB	BW	DW	IW	FP	LS
Acciptridae							
<i>Hypoestes cancellata</i>	-	-	X	X	X	-	-
<i>Monechma ciliatus</i>	-	-	X	X	X	-	-
<i>Acanthus montanus</i>	X	-	-	-	-	-	-
<i>Acanthospermum hispidum</i>	-	-	-	-	X	-	-
Amaranthaceae							
<i>Celosia triguna</i>	-	X	-	-	-	-	-
Anacardiaceae							
<i>Lannea acida</i>	-	X	-	-	-	-	-
<i>Lannea shimperi</i>	X	-	X	X	X	-	-
Annonaceae							
<i>Annona senegalensis</i>	-	-	X	X	X	X	-
<i>Cleistopholis patens</i>	X	-	-	-	-	-	-
Araceae							
<i>Anchomanes welwitschii</i>	X	-	-	-	-	-	-
Asteraceae							
<i>Ageratum conyzoides</i>	X	-	-	-	-	X	-
Athyriaceae							
<i>Diplazium sammatii</i>	X	-	-	-	-	-	X
Bignoniaceae							
<i>Kigelia africana</i>	-	-	X	-	-	-	-
<i>Stereospermum kunthianum</i>	-	X	X	-	-	-	-
<i>Markhamia tomentosa</i>	X	-	-	-	-	-	-
Bombacaceae							
<i>Bombax costatum</i>	-	X	X	-	-	-	-
Burseraceae							
<i>Boswellia dalzielii</i>	-	-	-	-	X	-	-
Caesalpiniaceae							
<i>Azelia africana</i>	-	-	X	X	X	-	-
<i>Burkea africana</i>	-	X	X	X	X	-	-
<i>Cassia mimosoideis</i>	X	-	-	-	-	X	-
<i>Daniellia oliveri</i>	-	X	X	X	X	-	-
<i>Detarium microcarpum</i>	-	-	X	X	X	-	-
<i>Erythrophleum africanum</i>	-	-	X	X	X	-	-
<i>Isobrerlinia doka</i>	-	-	-	X	X	-	-
<i>Piliostigma thoningii</i>	-	X	X	X	X	-	-
<i>Dialium guineense</i>	X	-	-	-	-	-	-
Caparidaceae							
<i>Crataeva adansonii</i>	-	-	-	-	-	-	X
Caryophyllaceae							
<i>Polycarpha eriantha</i>	-	-	-	-	-	X	-
Celastraceae							
<i>Maytenus senegalensis</i>	-	X	X	X	X	-	-
Combretaceae							
<i>Anogeissus leiocarpus</i>	X	X	X	X	X	-	-
<i>Combretum glutinosum</i>	X	X	X	X	X	-	-
<i>Combretum molle</i>	-	-	X	X	X	-	-
<i>C. nigricans</i>	-	-	X	X	X	-	-
<i>C. lamprocarpum</i>	-	-	X	X	X	-	-
<i>Pteleopsis suberosa</i>	-	-	X	X	-	-	-
<i>Terminalia glaucescens</i>	-	X	X	X	X	-	-
<i>T. macroptera</i>	X	X	X	-	-	-	-
Compositae							
<i>Tridax procumbens</i>	-	-	-	-	-	X	-
<i>Vernonia ambigua</i>	-	-	-	X	X	X	-
<i>V. perrottetii</i>	-	-	-	-	-	X	-
Convolvulaceae							
<i>Ipomoea involucre</i>	X	-	-	-	-	-	-
Euphorbiaceae							
<i>Uapaca heudelotii</i>	X	-	-	-	-	-	-
<i>Bridelia ferruginea</i>	X	X	X	X	X	-	-
<i>Hymenocarida acida</i>	-	X	X	X	X	-	-
Eupatoriaceae							
<i>Chromolaena odoratum</i>	X	-	-	-	-	-	-
Labiatae							

Table 1: Continued

Taxa/scientific name	Habitat types						
	RF	DB	BW	DW	IW	FP	LS
<i>Leucas martinicensis</i>	-	-	-	-	-	X	-
<i>Hyptis lanceolata</i>	-	-	-	X	X	X	-
<i>Leonotis nepetifolia</i>	-	-	-	-	-	X	-
Lecythidaceae							
<i>Napoleona imperialis</i>	X	-	-	-	-	-	-
Loganiaceae							
<i>Anthocleista djalensis</i>	X	-	-	-	-	-	-
<i>Strychnos innocua</i>	-	X	X	X	X	-	-
<i>S. spinosa</i>	-	X	X	X	X	-	-
Malvaceae							
<i>Abutilon mauritianum</i>	X	X	-	-	-	-	-
<i>Hibiscus asper</i>	-	X	-	-	-	-	-
<i>Sida rhombifolia</i>	-	-	-	-	-	X	-
<i>S. corymbosa</i>	-	-	X	X	X	X	-
Melastomataceae							
<i>Dissotis erecta</i>	X	-	-	-	-	-	-
<i>Melochia corchorifolia</i>	-	-	-	-	-	-	X
Mellaceae							
<i>Khaya senegalensis</i>	-	-	-	-	X	-	-
<i>Pseudocedrela kotschy</i>	-	-	-	-	X	-	-
Mimosaceae							
<i>Acacia senegal</i>	-	X	X	X	X	-	-
<i>Dichrostachys cinerea</i>	-	-	X	X	-	-	-
<i>Entada africana</i>	-	-	-	X	X	-	-
<i>Mimosa pigra</i>	-	-	-	-	-	X	-
<i>Parkia biglobosa</i>	X	-	X	-	X	-	-
<i>Prosopis africana</i>	-	X	X	-	X	-	-
<i>Schrankia leptocarpa</i>	-	-	-	-	-	X	X
<i>Albizia zygia</i>	X	-	-	-	-	-	-
Moraceae							
<i>Ficus sp</i>	X	X	-	-	X	-	-
Myristicaceae							
<i>Pycnanthus angolensis</i>	X	-	-	-	-	-	-
Myriaceae							
<i>Syzygium guineense</i>	X	X	X	X	X	-	-
Nymphaeaceae							
<i>Nymphaea lotus</i>	-	-	-	-	-	-	X
<i>N. maculata</i>	-	-	-	-	-	-	X
Ochnaceae							
<i>Lophira lanceolata</i>	-	X	X	X	X	-	-
Onagraceae							
<i>Palisota hirsute</i>	X	-	-	-	-	-	-
<i>Ludwigia abyssinica</i>	-	-	-	-	-	-	X
Papilionaceae							
<i>Crotalaria macrocalyx</i>	-	-	-	X	-	-	-
<i>Pterocarpus erinaceus</i>	-	X	X	X	-	-	-
<i>P. santalinoides</i>	X	-	-	-	-	-	X
<i>Tephrosia bracteolata</i>	-	X	X	-	-	-	-
<i>Andira inermis</i>	X	X	-	-	-	-	-
<i>Afrormosia laxiflora</i>	-	-	-	-	X	-	-
Pedallaceae							
<i>Sesamum indicum</i>	-	-	-	X	-	-	-
<i>S. alatum</i>	-	-	X	X	X	-	-
Rosaceae							
<i>Parinari curatellifolia</i>	-	X	X	X	X	-	-
<i>P. polyandra</i>	-	X	X	X	X	-	-
Rubiaceae							
<i>Borreria spp</i>	-	-	-	-	-	X	-
<i>Crossopteryx febrifuge</i>	-	X	X	-	-	-	-
<i>Diodia scandens</i>	-	-	X	X	-	-	-
<i>Gardenia aqualla</i>	-	-	X	X	X	-	-
<i>G. sokotensis</i>	-	-	X	X	X	-	-
<i>G. ternifolia</i>	-	-	X	X	X	-	-
<i>Mitragyna inermis</i>	-	-	-	-	-	X	-
<i>Richardia brasiliensis</i>	-	-	X	X	-	X	-

Table 1: Continued

Taxa/scientific name	Habitat types						
	RF	DB	BW	DW	IW	FP	LS
<i>Nauclea latifolia</i>	x	-	-	-	-	-	-
<i>Morelia senegalensis</i>	-	-	-	-	-	x	x
Samydaceae							
<i>Santiria trimera</i>	x	-	-	-	-	-	-
Sapindaceae							
<i>Paullinia pinnaga</i>	x	-	-	-	-	-	-
Sapotaceae							
<i>Vitellaria paradoxa</i>	-	x	x	x	x	-	-
<i>Synepalum glycyderum</i>	x	-	-	-	-	-	-
<i>Malacantha alnifolia</i>	x	-	-	-	-	-	-
Scrophulariaceae							
<i>Securidaca longepedunculata</i>	x	-	x	-	-	-	-
<i>Striga hermonthea</i>	-	-	x	-	x	-	-
<i>S. aspera</i>	-	-	x	x	-	-	-
<i>S. bilabiata</i>	-	-	x	x	x	-	-
Simulacaceae							
<i>Hannoa undulata</i>	-	x	x	-	-	-	-
Solanaceae							
<i>Physalis micrantha</i>	-	-	-	-	x	-	-
<i>Spermacoce verticillata</i>	-	-	x	x	x	-	-
Sterculiaceae							
<i>Sterculia setigera</i>	-	-	x	x	x	-	-
<i>Waltheria indica</i>	-	x	-	-	-	-	-
<i>Pterygota bequaertii</i>	x	x	-	-	-	-	-
Tilliaceae							
<i>Clappertonia flcifolia</i>	-	-	-	-	-	x	-
<i>Grewia mollis</i>	-	x	x	x	x	-	-
Verbenaceae							
<i>Lantana rhodensis</i>	x	-	-	-	-	-	-
<i>Stachytarpheta indica</i>	-	-	-	-	-	x	-
<i>Vitex doniana</i>	x	x	x	-	x	-	-
Commelinaceae							
<i>Commellina benghalensis</i>	x	x	x	x	x	-	-
Cyperaceae							
<i>Pycnus lanceolatus</i>	-	-	-	-	-	-	x
<i>Cyperus difformis</i>	-	-	-	-	-	-	x
<i>Kyllinga erecta</i>	-	-	-	x	-	-	-
<i>Fimbristylis littoralis</i>	-	-	-	x	-	-	-
<i>F. ferruginea</i>	-	-	-	-	-	-	x
<i>Mariscus alternifolius</i>	-	-	x	-	-	-	-
<i>Scleria verrucosa</i>	x	-	-	-	-	-	x
Dioscoreaceae							
<i>Dioscorea prochenisilis</i>	x	x	x	x	x	-	-
Palmae							
<i>Borassus aethiopum</i>	x	-	x	x	x	-	-
<i>Elaeis guineensis</i>	x	-	x	-	-	-	-
<i>Raphia sudanica</i>	x	-	x	x	x	-	-
Pandanaceae							
<i>Pandanus candelabrum</i>	x	-	-	-	-	-	-
Poaceae							
<i>Andropogon gayanus</i>	-	x-	x	x	x	x	-
<i>A. tectorum</i>	x	x	x	x	x	-	-
<i>Brachiaria deflexa</i>	-	-	-	x	x	-	-
<i>Chloris gayana</i>	-	-	x	-	x	x	-
<i>Digitaria horizontalis</i>	-	-	x	-	x	-	-
<i>Urochloa trichopus</i>	-	-	-	x	x	-	-
<i>Eragrostis tenella</i>	-	-	-	-	x	x	-
<i>E. tremula</i>	-	-	-	-	-	x	-
<i>Hyparrhenia rufa</i>	-	x	x	x	x	-	-
<i>H. involucre</i>	-	-	x	x	x	-	-
<i>H. violascens</i>	-	-	-	x	-	x	-
<i>H. smithiana</i>	-	-	-	-	x	x	-
<i>H. dissolute</i>	-	-	x	-	-	-	-
<i>Imperata cylindrical</i>	-	x	x	-	-	-	-
<i>Jardinea congoensis</i>	-	-	-	-	-	x	-

Table 1: Continued

Taxa/scientific name	Habitat types						
	RF	DB	BW	DW	IW	FP	LS
<i>Paspalum orbiculare</i>	-	-	x	-	-	x	-
<i>P. polystachyum</i>	-	-	-	-	-	x	-
<i>Pennisetum pedicellatum</i>	-	-	-	-	-	x	-
<i>P. purpureum</i>	-	-	-	x	x	x	-
<i>Setaria harbata</i>	-	-	x	-	x	-	-
<i>Sporobolus festivus</i>	-	-	-	x	x	-	-
<i>Vetiveria nigriflora</i>	-	x	-	-	-	x	-
Azollaceae							
<i>Azolla africana</i>	-	-	-	-	-	-	x
Total	45	42	70	63	67	34	14

Table 2: Number of plant species by families in pandam wildlife park

S/no	Family	No of species	% of total species
1	Acanthaceae	4	2.64
2	Amaranthaceae	1	0.66
3	Ancardiaceae	2	1.32
4	Annonaceae	2	1.32
5	Araceae	1	0.66
6	Asteraceae	1	0.66
7	Athyriaceae	1	0.66
8	Azollaceae	1	0.66
9	Bignoniaceae	3	1.98
10	Bombacaceae	1	0.66
11	Burseraceae	1	0.66
12	Caesalpiniaceae	9	5.94
13	Capparidaceae	1	0.66
14	Caryophyllaceae	1	0.66
15	Celastraceae	1	0.66
16	Combretaceae	8	5.28
17	Compositae	3	1.98
18	Convolvulaceae	1	0.66
19	Commelinaceae	1	0.66
20	Cyperaceae	7	4.62
21	Dioscoreaceae	1	0.66
22	Euphorbiaceae	3	1.98
23	Eupatoriaceae	1	0.66
24	Labiatae	3	1.98
25	Lecythidaceae	1	0.66
26	Loganiaceae	3	1.98
27	Malvaceae	4	2.64
28	Melastomataceae	2	1.32
29	Meliaceae	2	1.32
30	Mimosaceae	8	5.28
31	Moraceae	1	0.66
32	Muricaceae	1	0.66
33	Myriaceae	1	0.66
34	Nymphaeaceae	2	1.32
35	Ochnaceae	1	0.66
36	Onagraceae	2	1.32
37	Papilionaceae	6	3.96
38	Pedaliaceae	2	1.32
39	Palmae	3	1.98
40	Pandanaceae	1	0.66
40	Poaceae	22	14.52
42	Rosaceae	2	1.32
43	Rubiaceae	10	6.60
44	Samydaceae	1	0.66
45	Sapindaceae	1	0.66
46	Sapotaceae	3	1.98
47	Scrophylariaceae	4	2.64
48	Simulacaceae	1	0.66
49	Solanaceae	2	1.32
50	Sterculiaceae	3	1.98
51	Tilliaceae	2	1.32
52	Verbenaceae	3	1.98
	Total	152	100.00

Table 3: Girth-classes of tree species (≥ 10 cm/dbh) in the vegetation of pandam wildlife park

Habitat/vegetation types	% In girth-classes (cm)			Total
	0-50	50-100	≥ 100	
Riparian forest	92.70	7.30	-	100
Daniellia-vitellaria association	86.96	12.56	0.48	100
Burkea woodland	100.00	-	-	100
Detarium woodland	98.47	1.53	-	100
Isobrerlinia woodland	96.23	3.77	-	100

Table 4: Height-classes and crown cover of trees in pandam wildlife park

Habitat/vegetation types	% In heightclasses (cm)			Crown cover (mha ⁻¹)
	0-50	10-20	≥ 20	
Riparian forest	27.56	40.00	32.44	9488.16
Daniellia- vitellaria association	41.06	34.78	24.16	8888.88
Burkea woodland	82.82	17.00	0.18	3754.30
Detarium woodland	26.36	48.16	25.46	5418.30
Isobrerlinia woodland	69.81	24.53	5.66	5539.56

From Table 1, plant species in the Caesalpiniaceae, Celastraceae, Combretaceae, Euphorbiaceae, Loganiaceae, Rosaceae, Rubiaceae Dioscoreaceae and Poaceae families occurred in each of the four woodlands except the flood plain and the riparian forest. *Lannea shimperi*, *Anogeissus leiocarpus*, *Combretum glutinosum*, *Dioscorea prochenensis* and *Borassus aethiopium* were the savanna woodland species that also occurred in the riparian forest.

Floristic structure in pandam wildlife park: Table 3 shows the girth at breast height of the trees found in plots of each vegetation type. In the riparian forest, the percentage of trees in the girth class of 0-50cm was 92.70%, while that of 50-100cm was 7.30%. In Daniellia-Vitellaria association, the range was 0.48% trees in the ≥ 100 cm to 86.96% trees the 0-50 cm girth classes. In the Burkea woodland, all the trees encountered were within the girth class of 0-50 cm. The other two woodland types contained similar percentages of trees in each of 0-50 cm and 50-100 cm girth classes. The general pattern shows that most of the trees are in the 0-50cm girth class category irrespective of the vegetation type.

The height classes of trees in each vegetation type are shown in Table 4. The lowest values of 26.38 and 27.56% recorded for the $0 \geq 10$ m height class were obtained from Detarium woodland and the Riparian forest, respectively. The Burkea woodland recorded the lowest values of 17.00 and 0.18% in the $10 \leq 20$ cm and $0 \geq 20$ m height classes respectively, while the highest value of 32.44% from ≥ 20 m height class was recorded in the riparian forest. Crown cover was numerically similar for both the riparian forest and Daniellia-Vitellaria association. The value of 3754.30 m ha⁻¹ obtained in the Burkea woodland was about 40% of the covered area in either the riparian forest or Daniellia- Vitellaria association, but constituted more than 67% of the cover in either Detarium woodland or Isoberlinia Woodland.

DISCUSSION

A total of 152 species of vascular plants belonging to 52 families were listed in the park, with Poaceae having the highest frequency of occurrence. This agrees with the description of McNaughton and Wol (1979) and Pomeroy and Service (1992) that savanna ecosystem is a vegetation dominated by grass species with trees forming a scattered open canopy. Trees and grasses characteristics of the savanna as listed by Ghazanfar (1989) are also dominant in the park and include; *Vitex doniana*, *Andira inermis*, *Syzygium guineense*, *Burkea africana*, *Azelia africana*, *Detarium microcarpum*, *Pterocarpus erinaceus*, *Vitellaria paradoxa*, *Daniellia oliveri*, *Crossopteryx febrifuga*, *Erythrophleum africanum*, *Combretum molle*, *Terminalia glaucescens*, *Isoberlinia doka* and *Lophira lanceolata* among trees, while herbaceous plants include; *Hyparrhenia* sp., *Andropogon* sp., *Vetiveria nigriflora*, *Eragrostis* sp. and *Hyptis lanceolata*.

The general pattern of the girth class of trees showed that most of the trees are in the $0 \leq 50$ cm girth class category irrespective of the vegetation type, while majority of the trees were in the height classes of $0 \leq 10$ cm and $10 \leq 20$ m in all the vegetation types. These structural characteristics are indicative of subclimax vegetation as had been reported by Pomeroy and Service (1992). However, the Riparian forest and Daniellia-Vitellaria association recorded 32.44 and 25.46% of trees respectively in the height class ≥ 20 m suggesting the occurrence of reasonable number of tall trees in these vegetation types which may be significant for the survival of primates.

The 152 plant species in the park is lower than the 5,303 plant species reported in the country study report on met and unmet needs for conservation (FEPA, 1992). The lower number is however, not unexpected as the Pandam Wildlife Park is an insignificant fraction of the total guinea savanna zone. Apart from the 152 species,

there were 65 species of herbaceous plants of conservation interest. First, both the grasses and forbs are important food resources of wildlife species. Second, these grasses and forbs are usually subjected to environmental stressors such as annual wildfire and trampling by game viewing visitors who drive off track. It is therefore possible that these herbaceous plants could be more than 65 species in Pandam Wildlife Park if adequate conservation measures are put in place by management.

Although the height classes of trees in the woodland savanna is important to the monkeys as earlier mentioned, crown cover is more important in the provision of shade and cover for all the wildlife species. Thus, the highest (9488.16 m ha⁻¹) cover obtained in the riparian forest might be of great value to wildlife species in the zone. On the whole, the interspersed of different vegetation types in the park could be its greatest asset for the conservation of wildlife resources.

CONCLUSION

In general, this study has provided baseline information on the flora species richness of the park which would be very adequate and useful for the preparation of a management plan. Furthermore, the species list provided, if married with species listing for other conservation areas and inviolate forest areas in the country could be used to update the Nigeria's flora resources or the conservation status of some of the species.

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