



Preliminary Floristic Inventory of the Swamp Forest of Atan Ukwok Village in Ini L.G.A of Akwa Ibom State, Nigeria

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Authors' contributions

This work was carried out in collaboration between all authors. Author MEB supervised the author MEJ who carried out the field work alongside author OTU. Authors MEB, OTU and MEJ collected the plant samples in the field and Author MEB authenticated the identification of the plants. Author OTU wrote the first draft of the manuscript. Author MEB perfected the final manuscript. All authors read and approved the final manuscript.

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ABSTRACT

The Floristic inventory of the swamp forest at Atan Ukwok was carried out using the Systematic and Transect Sampling Methods where the line transect was the main path of the forest and Sampling units were chosen along the path at a distance of 14m × 14m and 6 sampling plots were sampled. The frequency, density and abundance of the identified species were calculated using standard formulae. A total number of 61 species from 35 families were identified. The number of species recorded for the plant families were, Cyperaceae 5, Euphorbiaceae 4, Acanthaceae, Apocynaceae, Asteraceae, Aspidiaceae and Poaceae 3 each, Arecaceae, Caesalpiniaceae, Mimosaceae, Melastomataceae, Schizaceae, Thelypteridaceae and Verbanaceae 2 each and Athyriaceae, Costaceae, Dioscoreaceae, Dracaenaceae, Gleicheniaceae, Araceae, Davillianaceae, Malvaceae, Commelinaceae, Clusiaceae, Selaginellaceae, Combretaceae, Convolvulaceae, Colchicaceae, Fabaceae, Moraceae, Malvaceae, Lycopodiaceae and Rutaceae 1 each. The highest species frequency and density of 66.7% and 9.5% respectively was found in *Setaria megaphylla* and the highest abundance value of 50.0 was found in *Dracaena arborea*. The frequency percentage of the

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plant species showed that the forest is fast losing vegetation due to the obvious encroachment of parts of it by the inhabitants of the community for the purpose of cultivation. This calls for concerted conservation measures in order to ensure the sustainable use of the floral diversity of the forest.

Keywords: Floristic inventory; Atan Ukwok; Akwa Ibom state; conservation.

1. INTRODUCTION

Atan Ukwok village in Ini Local Government Area is located in Akwa-Ibom State, Southern part of Nigeria. It has a land area of 320,451 square kilometers with a coordinate of 5°24'0" N and 7°44'0" E. The local government is recognized for its natural resources such as Limestone, Clay, Granites, Fine sand, Crude oil, Gold and Iron Ore [1]. The forest region provides timber and firewood. Due to the land expanse of the area, the indigenes are predominantly farmers producing crops such as rice, oil palm, cassava, cocoa, banana and so on which makes them the food basket of Akwa-Ibom State. Ini Local Government Area is inhabited by 99,196 indigenes from the last census carried out. There are 6 clans namely; Nkari, Iwere, Ukwok, Ikpe, Itu mbonuso and Odoro Ikono. There are a total of 93 villages in Ini Local Government Area [1].

Scientists have surveyed remote galaxies and have stood on the surface of the moon but have not so far come anywhere near to completing a taxonomic catalogue of the fewer than half a million species of higher plants that grow on our planet [2]. The first and foremost process in ascertaining the biodiversity is the taxonomic treatment of living organisms which can be achieved only through the process involving extensive exploration, identification and documentation [3].

The study of floristic composition of the vegetation is crucial for conservation management and the ecologically sustainable management of natural resources that provides the starting point for more detailed study [4,5]. Vegetation documentation and classification efforts are also required for biological conservation, from planning and inventory to direct resource management [6]. According to [7] every parcel of land that is converted, cultivated or developed will likely result in a loss of unique life forms found nowhere else in the planet.

The increasing population of inhabitants in the State put the remaining vegetation in danger of extermination to give room for infrastructures and land for agricultural purposes. Hence, this study is aimed at collecting and assessing the diversity,

estimating the distribution, documenting and preserving different plant species in Atan Ukwok swamp forest in order to contribute to the overall biodiversity data base.

2. METHODOLOGY

2.1 Study Area

The study was carried out at several locations within the swamp forest of Atan Ukwok in Ini Local Government Area. Atan Ukwok is situated 64.2km from Uyo, the capital city of Akwa Ibom State, Nigeria. (See Fig. 1).

2.2 Sampling

Systemic and Transect Survey method of sampling were used. While the Systemic sampling allowed the calculation of the diversity of plant species that are found in Atan Ukwok forest, the Transect survey further enriched the data collection and allowed the study of species distribution according to altitude. The line transect was used taking the main entrance/path to the forest as the line transect and Sampling units were chosen along the main path at a uniform distance of 14m × 14m (Fig. 2).

2.3 Collection and Authentication of Specimens

Plant species found at specified sampling plots were recorded and collected. The data of the collected plants were recorded in the field notebook and the coordinates of the plot were also taken using a GPS device (Table 2). The plant species were identified and authenticated by a taxonomist, Prof. Margaret E. Bassey in the Department of Botany and Ecological Studies. Voucher specimens were deposited in the University of Uyo Herbarium (UUYH).

2.4 Common Names and Utility of Plants

The common names for the species were obtained from [8].

Uses of plants were compiled from the testimonies of those who use them to indicate which parts are edible and how the plants are otherwise utilized.

2.5 Statistics

The frequency, density and abundance of species were calculated using the method of [9], with the following formula:

Frequency (%) = $\{(Total\ no.\ of\ sampling\ plots\ in\ which\ the\ species\ occurred / Total\ number\ of\ sampling\ plots\ studied) \times 100\}$

Density = $(Total\ number\ of\ individuals\ of\ the\ same\ species\ in\ all\ the\ sampling\ plots / Total\ number\ of\ sampling\ plots\ studied)$.

Abundance = $(Total\ no\ of\ the\ individuals\ of\ the\ species\ in\ all\ the\ sampling\ units / Number\ of\ sampling\ units\ in\ which\ the\ species\ Occurred)$

3. RESULTS

The plant species, their families and their common names are listed in Table 1. A total of 61 different species in 35 families were listed.

The Cyperaceae had the highest number of species (5) followed by the Euphorbiaceae (4), then the Apocynaceae, Acanthaceae, Leguminosae, Asteraceae, Aspidiaceae and Poaceae had 3 different species each and the Araceae, Papilionaceae, Verbenaceae, Melastomataceae, Caesalpiniaceae, Mimosaceae, Schizaceae, Thelypteridaceae and Pteridaceae had 2 different species each. The families with the least number of species included Athyriaceae, Costaceae, Dioscoreaceae, Dracaenaceae, Gleicheniaceae, Araceae, Davillianaceae, Mimosaceae, Malvaceae, Commelinaceae, Clusiaceae, Selaginellaceae, Combretaceae, Convolvulaceae, Colchicaceae, Fabaceae, Moraceae, Malvaceae, Lycopodiaceae and Rutaceae which had one species each.

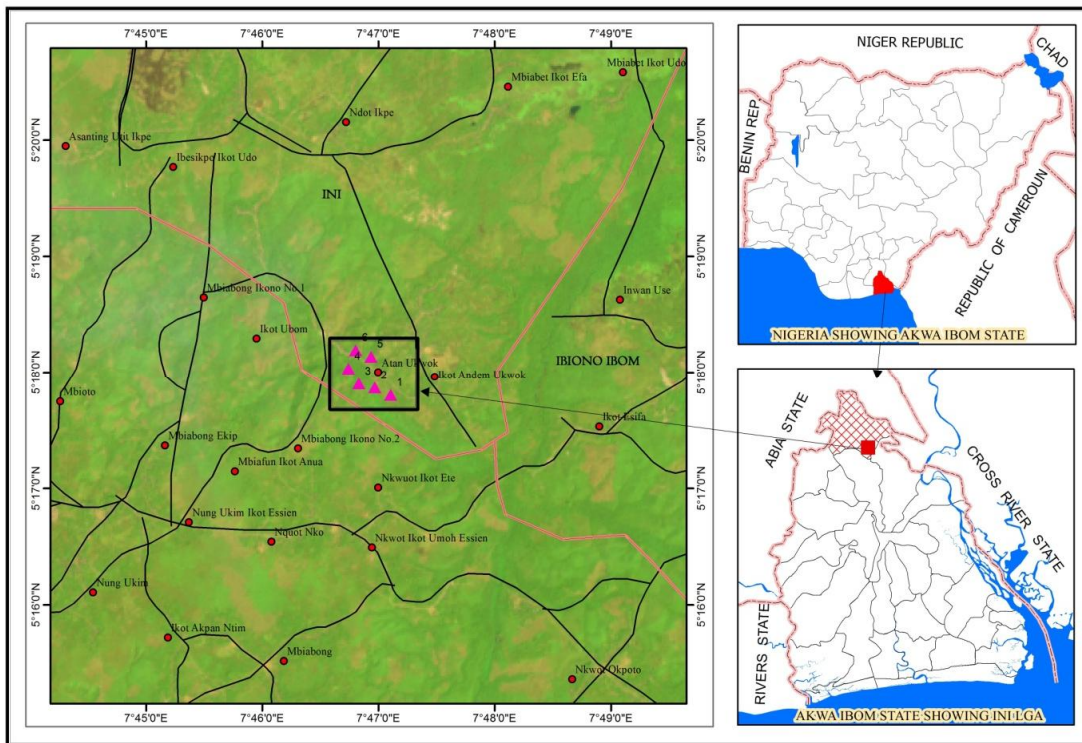


Fig. 1. Map of the Study Area

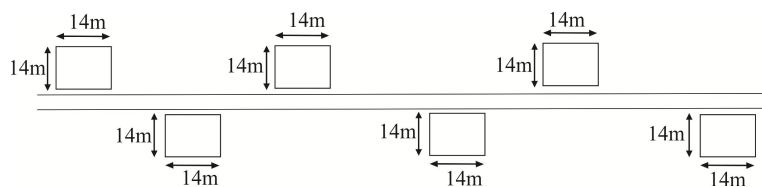


Fig. 2. Systematic sampling plot design

Table 1: List of Plant Species Collected in the Study Site

S/N	Plant Families	Plant Species	Common Names
1.	Acanthaceae	<i>Asystasia gangetica</i> (L.) T. Anderson <i>Acanthus montanus</i> T. Anderson <i>Brillantaisia lamium</i> Benth.	Hunter's spinach False thistle
2.	Apocynaceae	<i>Rauvolfia vomitoria</i> Wennberg <i>Alstonia boonei</i> De Wild <i>Allamanda cathartica</i> L.	Poison devil's pepper God's tree Golden trumpet
3.	Araceae	<i>Cyrtosperma senegalense</i> Engl.	Giant swamp taro
4.	Arecaceae	<i>Elaeis guineensis</i> Jacq. <i>Raphia hookeri</i> G. Mann & H. Wendl.	African oil palm Raffia Palm
5.	Aspidiaceae	<i>Ctenitis lanuginosa</i> (Willd. Ex Kaulf.) Copel <i>Ctenitis speciosa</i> (Mett ex Kuhn) Alston. <i>Ctenitis pilossissima</i> (J. Sm. ex Moore) Alston	
6.	Asteraceae	<i>Aspilia africana</i> (Pers.) C.D Adams <i>Vernonia cinerea</i> (L.) Less <i>Emilia praetermissa</i> Milne-Redh.	Haemorrhage plant French violet Tassel flower
7.	Athyraceae	<i>Diplazum sammatii</i> (Kuhn) C. Chr	
8.	Caesalpinaceae	<i>Anthonotha macrophylla</i> P.Beauv <i>Dialium guineense</i> Willd.	African rose wood Velvet tamarind
9.	Clusiaceae	<i>Harungana madagascariensis</i> Poir	Dragon blood tree
10.	Colchicaceae	<i>Gloriosa superba</i> L.	Flame lily
11.	Combretaceae	<i>Combretum zenkeri</i> Engl. & Diels	Bush willows
12.	Commelinaceae	<i>Commelina aquatica</i> J. K. Morton	Climbing flower
13.	Convolvulaceae	<i>Ipomea involucreta</i> F. Dietr. ex Choisy	Water convolvulus
14.	Costaceae	<i>Costus afer</i> Ker-Gawl	Ginger lily
15.	Cyperaceae	<i>Fuirena umbellata</i> Rottb <i>Kyllinga bulbosa</i> J. Koenig ex Vahl. <i>Fimbristylis squarrosa</i> Vahl. <i>Fimbristylis hispidula</i> Kunth <i>Pycreus lanceolatus</i> C. B. Clarke	Bush knife Rat grass Lance sledge
16.	Davalliaceae	<i>Nephrolepis biserrata</i> (Sw.) Schott.	Broad sword fern
17.	Dioscoreaceae	<i>Dioscorea bulbifera</i> L.	Air potato
18.	Dracaenaceae	<i>Dracaena arborea</i> Hort. Angl. ex Link	

19.	Euphorbiaceae	<i>Manihot esculenta</i> Crantz <i>Alchornea cordifolia</i> (Schum.) Mull.Arg. <i>Manniophyton fulvum</i> Mull. Arg. <i>Microdesmis puberula</i> Hook. f.	Cassava Christmas bush Gassonut
20.	Fabaceae	<i>Crotalaria retusa</i> L.	Rattle weed
21.	Gleicheniaceae	<i>Gleichenia linearis</i> (Burm. f.) C. B. Clarke	Coral fern
22.	Lycopodiaceae	<i>Lycopodium clavatum</i> L.	Stag's-horn club moss
23.	Malvaceae	<i>Urena lobata</i> L.	Congo jute
24.	Melastomataceae	<i>Tristemma coronatum</i> Benth. <i>Heterotis rotundifolia</i> (Sm.) Jacq.	Rock rose
25.	Mimosaceae	<i>Mimosa pudica</i> L. <i>Pentaclethra macrophylla</i> Benth.	Shame plant African Oil bean tree
26.	Moraceae	<i>Musanga cecropioides</i> R. Br.	
27.	Papilionaceae	<i>Desmodium adscendens</i> (SW.) DC <i>Amphicarpaea africana</i> Harms	Bush groundnut
28.	Poaceae	<i>Setaria megaphylla</i> T. Durand & Schinz <i>Bambusa vulgaris</i> Schrad. ex J. C. Wendl. <i>Schizachyrium rupestre</i> Stapf.	Corn grass English bamboo
29.	Pteridaceae	<i>Pteris acanthoneura</i> Alston <i>Pteris burtonii</i> Bak.	
30.	Rutaceae	<i>Citrus sinensis</i> (L.) Osbeck	Orange
31.	Schizaeaceae	<i>Lygodium smithianum</i> C. Presl <i>Lygodium microphyllum</i> (Cav.) R.Br.	
32.	Selaginellaceae	<i>Selaginella kraussiana</i> (Kunze) A. Braun.	Kraus's clubmoss
33.	Thelypteridaceae	<i>Cyclosorus striatus</i> (Schum.) Ching <i>Menisorus pauciflorus</i> (Hook)Alston	Stiff flower
34.	Urticaceae	<i>Laportea aestuans</i> (L.) Chew	African nettle
35.	Verbenaceae	<i>Stachytarpheta jamaicensis</i> (L.) Vahl <i>Stachytarpheta cayennensis</i> (Rich) Vahl	Light blue snake weed Dark blue snake weed

Table 2 shows the number of plant species identified in each sampling plot. The GPS location and altitude were also indicated. Sampling Point 1 (N 05'.29738, E 007'78242) was at the entrance to the forest. It was sandy and marshy and *Schizachyrium rupestre*. dominated the sandy portion. There was also a cassava farm. A total of 28 species were recorded for this plot. Sampling point 2 (N 05'.29732, E 007'.78192) was by a fast flowing stream where *Aspilia africana* was more frequent and a total of 15 species were recorded. Sampling point 3 (N 05'. 29727, E 007.78123) was a forested hilly slope with high altitude where *Ctenitis speciosa* was more frequent and 12 species were recorded. Sampling point 4 (N 05'.29727, E 007'78123) was along a sandy trail where there was a cassava farm and *Setaria megaphylla* was found to be more frequent. 10 species were recorded. Sampling point 5 (N 05'.30102, E 007'.78153) was a forested ravine with tall trees such as *Rauvolfia vomitoria*, *Harungana madagascariensis*, *Elaeis guineensis*, *Pentaclethra macrophylla* and *Alchornea cordifolia*. There was also abundance of mosses and 13 species were recorded. Sampling point 6 (N 05'.30102, E 007'.78153) was a swampy area with more of ferns such as *Lygodium smithianum*, *Nephrolepis biserrata*, *Ctenitis pilosissima*, *Pteris burtonii*, *Ctenitis speciosa* and *Ctenitis lanuginosa*. 15 species were recorded. Sampling point 5 had the highest altitude of 42m and Sampling point 1 was the lowest altitude of 21m.

Table 3 lists the species found in each sampling point and the total number of each in the six plots, the number of quadrats, the percentage frequency, frequency class, abundance and density of each of the species. The species with the highest percentage frequency and density was *Setaria megaphylla* (66.7% and 9.5% respectively). The species with the highest abundance (50.0) was *Dracaena arborea*.

4. DISCUSSION

The floristic survey of the Atan Ukwok forest recorded a total of 61 species from 35 families. The family Cyperaceae recorded 5 species. This is not surprising being that sedges are common species of wetland areas.

The sampling cut across different kinds of habitats which included aquatic, terrestrial,

swamp, ravine and hilly habitat. Sampling point 6 had 7 species of ferns while sampling point 3 followed with 4 species of ferns. Sampling point 1 and 2 recorded 3 species of ferns each, sampling point 5 recorded 2 species of ferns while no fern was found in sampling point 4. The survey showed that ferns were 16.96% in occurrence, one species was rare in occurrence, 9 were occasional and 4 were frequent. Compared to other vascular plants fern diversity is usually fewer in occurrence in vegetation sampling [10].

Some plants recorded in this work have been reported by several authors to have been of great medicinal importance and these plants have also been confirmed by the local inhabitants of the study area to have been of medicinal importance to them. They are as follows: the latex of *Alstonia boonei*, has been reported to be effective as a quick relief for *Filaria*-induced Calabar swelling which is in line with the report of Oliver-Bever [11]. The sap of *Aspilia africana* crushed leaves with salt and lime juice have been used as drops on the eye to treat cataract and other eye problems by the locals which is similar to the reports of Abbiw [12]. The root of *Microdesmis puberulla* is used in the treatment of gonorrhoea and erectile dysfunction [13,14]. The leaves of *Lygodium microphyllum* have been reported to be effective when applied externally as a poultice in the treatment of skin diseases [14]. The Sesotho people of South Africa boil the *Gleichenia linearis* plant in water and the steam is said to drive away ancestral spirit especially those which cause headache.

The plants with edible parts in the community that were identified in the course of this work were: *Elaeis guineensis*, *Dioscorea bulbifera*, *Dialium guineense*, *Manihot esculenta*, *Pentaclethra microphylla* and *Microdesmis puberulla*. *Allamanda cathartica* have been reported to be very useful as an ornamental plant used especially in the public school premises around the community.

The growing population which consequently manifests in the destruction of forest vegetation for farmlands calls for adequate conservation measures such as educating the communities and providing buffer zones for cultivation while conserving a portion of the forest in order to prevent the total loss of plant diversity.

Table 2. Sampling Point of Plant Species with GPS Location and Altitude

Sampling Points	GPS Location	Altitude(m)	Plant Species
1	N 05'.29738° E 007.78192°	21m	<ol style="list-style-type: none"> 1. <i>Elaeis guineensis</i> 2. <i>Aspilia africana</i> 3. <i>Gleichenia linearis</i> 4. <i>Stachytarpheta cayennensis</i> 5. <i>Manihot esculentus</i> 6. <i>Cyclosorus striatus</i> 7. <i>Tristemma coronatum</i> 8. <i>Desmodium adscendens</i> 9. <i>Costus afer</i> 10. <i>Mimosa pudica</i> 11. <i>Setaria megaphylla.</i> 12. <i>Urena lobata</i> 13. <i>Commelina aquatic</i> 14. <i>Bambosa vulgaris</i> 15. <i>Fimbristylis hispidula</i> 16. <i>Fimbristylis squarrosa</i> 17. <i>Pycreus lanceolatus</i> 18. <i>Fuirena umbellata</i> 19. <i>Asystasia gangetica</i> 20. <i>Vernonia cinerea</i> 21. <i>Schizachyrium rupestre</i> 22. <i>Cyrtosperma senegalense</i> 23. <i>Allamanda carthartica</i> 24. <i>Alchornea cordifolia</i> 25. <i>Kyllinga bulbosa</i> 26. <i>Dracaena arborea</i> 27. <i>Ipomoea involucrata</i> 28. <i>Ctenitis lanuginosa</i>
2	N 05'.29727° E 007'.78123	29m	<ol style="list-style-type: none"> 1. <i>Alstonia boonei</i> 2. <i>Cyclosorus striatus</i> 3. <i>Harungana madagascariensis</i> 4. <i>Desmodium adscendens</i> 5. <i>Dioscorea bulbifera</i> 6. <i>Setaria megaphylla</i> 7. <i>Selaginella kraussiana</i> 8. <i>Combretum zenkeri</i> 9. <i>Ipomoea involucrata</i> 10. <i>Lygodium smithianum</i> 11. <i>Amphicarpaea africana</i> 12. <i>Tristemma coratum</i> 13. <i>Aspilia africana</i> 14. <i>Asystasia gangetica</i> 15. <i>Ipomoea involucrata</i>

3	N 05'.29727° E 007'78123°	41m	<ol style="list-style-type: none"> 1. <i>Anthonotha macrophylla</i> 2. <i>Dialium guineense</i> 3. <i>Lygodium smithianum</i> 4. <i>Harungana madagascariensis</i> 5. <i>Nephrolepsis biserrata</i> 6. <i>Ctenitis pilosissima</i> 7. <i>Aspilia africana</i> 8. <i>Ctenitis speciosa</i> 9. <i>Ctenitis lanuginosa</i> 10. <i>Pteris acanthoneura</i> 11. <i>Menisorus pauciflorus</i> 12. <i>Allamanda carthartica</i>
4	N 05'.29727° E 007.78123°	32m	<ol style="list-style-type: none"> 1. <i>Heterotis rotundifolia</i> 2. <i>Setaria megaphylla</i> 3. <i>Manihot esculentus</i> 4. <i>Elaeis guineensis</i> 5. <i>Emilia praetermissa</i> 6. <i>Vernonia cinerea</i> 7. <i>Combretum zenkeri</i> 8. <i>Gloriosa superba</i> 9. <i>Dioscorea bulbifera</i> 10. <i>Ipomoea involucreta</i>
5	N 05'.30102° E 007'.78153	42m	<ol style="list-style-type: none"> 1. <i>Alchornea cordifolia</i> 2. <i>Rauvolfia vomitoria</i> 3. <i>Pteris acanthoneura</i> 4. <i>Pentaclethra microphylla</i> 5. <i>Harungana madagascariensis</i> 6. <i>Elaeis guineensis</i> 7. <i>Setaria megaphylla</i> 8. <i>Stachytarpheta jamaicensis</i> 9. <i>Manniophyton fulvum</i> 10. <i>Nephrolepis biserrata</i> 11. <i>Dialium guineense</i> 12. <i>Crotalaria retusa</i> 13. <i>Manihot esculentus</i>
6	N 05'.30102 E 007'78153	34m	<ol style="list-style-type: none"> 1. <i>Diplazium sammatii</i> 2. <i>Microdesmis puberula</i> 3. <i>Lygodium microphylla</i> 4. <i>Acanthus montanus</i> 5. <i>Musanga cecropioides</i> 6. <i>Gleichenia linearis</i> 7. <i>Sellaginella kraussiana</i> 8. <i>Laportea aestuans</i> 9. <i>Brillantaisia lamium</i> 10. <i>Citrus sinensis</i> 11. <i>Raphia hookeri</i> 12. <i>Nephrolepsis biserrata</i> 13. <i>Lycopodium clavatum</i> 14. <i>Pteris burtonii</i> 15. <i>Rauvolfia vomitoria</i>

Table 3. Frequency, Abundance and Density of Plant Species Collected in the Study Site

S/N	Plant species	Total Number of individual	Percentage frequency	Abundance	Density
1.	<i>Cyclosorus striatus</i>	8	33.3	4	1.3
2.	<i>Fuirena umbellata</i>	9	16.7	9	1.5
3.	<i>Desmodium adscendens</i>	6	33.3	3	1
4.	<i>Kyllinga bulbosa</i>	5	16.7	5	0.8
5.	<i>Aspilia africana</i>	34	50	11.3	0.5
6.	<i>Asystasia Gangetica</i>	31	33.3	15.5	5.2
7.	<i>Vernonia cinerea</i>	5	33.3	2.5	0.8
8.	<i>Fimbristylis squarossa</i>	9	16.7	9	1.5
9.	<i>Fimbristylis hispidula</i>	11	16.7	7	1.8
10.	<i>Pycneus lanceolatus</i>	7	16.7	7	1.2
11.	<i>Amphicarpaea africana</i>	8	16.7	8	1.3
12.	<i>Ctenitis speciosa</i>	15	16.7	15	2.5
13.	<i>Ctenitis pilosissima</i>	6	16.7	6	1.0
14.	<i>Costus afer</i>	10	16.7	10	1.7
15.	<i>Dioscorea bulbifera</i>	7	33.3	3.5	1.2
16.	<i>Pteris acanthoneura</i>	12	16.7	12	2
17.	<i>Lygodium microphyllum</i>	7	16.7	7	1.8
18.	<i>Menisorus pauciflorus</i>	13	16.7	13	2.2
19.	<i>Diplazium sammatii</i>	17	16.7	17	2.8
20.	<i>Elaeis guineensis</i>	36	50	12	6
21.	<i>Dracaena arborea</i>	50	16.7	50	8.5
22.	<i>Crytosperma senegalense</i>	6	16.7	6	1
23.	<i>Gleichenia linearis</i>	26	33.3	13	4.3
24.	<i>Stachytarpheta jamaicensis</i>	6	33.3	3	1
25.	<i>Stachytarpheta cayennensis</i>	4	16.7	4	0.7
26.	<i>Manihot esculentus</i>	17	50.0	5.7	4.2
27.	<i>Tristemma coronatum</i>	9	33.3	4.5	1.5
28.	<i>Mimosa pudica</i>	14	16.7	14	2.3
29.	<i>Allamanda cathartica</i>	11	33.3	5.5	0.8
30.	<i>Setaria megaphylla</i>	57	66.7	14.3	9.5
31.	<i>Urena lobata</i>	5	16.7	5	0.8
32.	<i>Commelina aquatica</i>	12	16.7	12	2
33.	<i>Bambusa vulgaris</i>	18	16.7	18	3
34.	<i>Alchornea cordifolia</i>	20	33.3	10	3.5
35.	<i>Harungana madagascariensis</i>	18	50	6	3
36.	<i>Alstonia boonei</i>	4	33.3	2	0.67
37.	<i>Selaginella kraussiana</i>	13	33.3	6.5	2.2
38.	<i>Combretum zenkeri</i>	10	33.3	5	1.7
39.	<i>Ipomea involucreta</i>	13	50	4.3	2.2
40.	<i>Lygodium smithianum</i>	13	33.3	6.5	2.2
41.	<i>Gloriosa superba</i>	5	33.3	2.5	0.8
42.	<i>Ctenitis lanuginosa</i>	14	16.7	14	2.3
43.	<i>Anthonotha macrophylla</i>	17	16.7	17	2.8
44.	<i>Dialium guineense</i>	21	33.3	10.5	3.5
45.	<i>Nephrolepis biserrata</i>	48	33.3	24	8
46.	<i>Heterotis rotundifolia</i>	13	16.7	13	2.2
47.	<i>Crotalaria spp</i>	2	16.7	2	0.3
48.	<i>Emilia praetermissa</i>	11	33.3	5.5	1.8

49. <i>Manniophyton fulvum</i>	16	16.7	16	2.7
50. <i>Acanthus montanus</i>	8	16.7	8	1.33
51. <i>Raulvolfia vomitoria</i>	12	33.3	6	2
52. <i>Pentaclethra microphyllum</i>	10	16.7	10	1.7
53. <i>Microdesmis puberulla</i>	6	16.7	6	1
54. <i>Musanga cecropioides</i>	12	16.7	12	2
55. <i>Laportea aestuans</i>	15	16.7	15	2.5
56. <i>Brillantaisia lamium</i>	13	16.7	13	2.2
57. <i>Schizachyrium rupestre</i>	41	16.7	41	6.8
58. <i>Citrus sinensis</i>	2	16.7	2	0.3
59. <i>Lycopodium clavatum</i>	15	16.7	15	2.5
60. <i>Pteris burtonii</i>	5	16.7	5	0.8
61. <i>Raphia hookeri</i>	7	16.7	7	1.2

5. CONCLUSION

The study has shown that based on the frequency percentage of these plant species that the forest is under threat of destruction of the vegetation due to the obvious encroachment of parts of it by the inhabitants of the community for the purpose of cultivation. The frequency of occurrence of the ferns in the study area also infer that there is a reasonable amount of anthropogenic interference whereby causing a reduced number of ferns in the habitat which should be ideal for ferns. There is therefore a need to put up conservation measures that will grow the forest vegetation to sustain the floral diversity of the forest.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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