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A Checklist of Angiosperm Diversity of Bowen University Campus, Iwo, Osun State, Nigeria

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ABSTRACT

The present work examines the angiosperm diversity of Bowen University, Iwo. Conventional methods of species enumeration as described by previous authors were employed and a comprehensive record of the existing species compiled. A total of 110 species in 96 genera and 42 families were recorded. Asteraceae, Euphorbiaceae and Poaceae were dominant with 10, 8 and 8 species, respectively. The trees also constituted the highest number with 47 species (42.72%). Further findings showed that 84 genera were represented with only 1 species each while others had 2 species each except *Ficus* with 4 species. This work suggests a look at the possible establishment of arboretum for *ex-situ* conservation within the study area.

Key words: Taxonomy, survey, flora, conservation

INTRODUCTION

The assessment of biological diversity has continued to attract the interest of scientists all over the world. According to Mittermeier *et al.* (2004), West African rainforests rank among the 34 most important biodiversity hotspots of the world. Nigeria with a rich biodiversity and tropical forest resources has been faced with challenges to species conservation, resulting from a number of human activities. One of such is habitat degradation. Apart from the protected areas, most of the country's natural habitats have already been converted to human-dominated ecosystems, such as farmland and pastures, plantations as well as urban and industrial areas. The rainforest and savanna woodland areas are the habitat types that are most threatened especially by agricultural conversion, as reported by USAID (2013). Taxonomic surveys have been helpful in documenting the species that had one time or the other existed in different locations within the country (Soladoye *et al.*, 2005, 2013; Anoliefo *et al.*, 2006) and the value of any biodiversity analysis and the adequacy of conservation measures depend on the quality of basic data, as put by Valdecasas and Camacho (2003). Similar studies have also been used to document medicinal plants reported to be valuable in the traditional management of ailments in Nigeria and other West African countries (Bhat *et al.*, 1990; Asase *et al.*, 2005; Soladoye *et al.*, 2014). However, Gbile *et al.* (1981) recorded

492 plant species in 112 families to be threatened, while Oguntala *et al.* (1996) reported 85 endangered tree species for Cross River State and its environs. With the continuous threat to species availability therefore, this study aims to document the numerous flora species existing within the Bowen University campus, Iwo and highlights the need for practical conservation to salvage our rich but endangered flora.

MATERIALS AND METHODS

Study area: Bowen University is situated in Iwo, one of the major cities in South West Nigeria on a 640 ha site. It lies on longitude 7°38' N and latitude 4°11' E at an altitude of 322 m above sea level (Fig. 1).

Species enumeration: The study was initiated in 2012 and completed in 2014. Field collection of plant species occurring within the university community was embarked upon. Representative specimens of each species were collected and identified using the taxonomic keys provided in Hutchinson *et al.* (1972), Lowe and Stanfield (1974), Lowe (1989) and Keay (1989) and comparison with existing collections deposited at Forest Herbarium, Ibadan (FHI) (Holmgren *et al.* 1990). Correct names of the identified species follow International Plant Name Index (IPNI). A comprehensive list of species was thereafter carefully documented, along with their families, habits and local name(s) with which they are known within the study area.

RESULTS AND DISCUSSION

A total of 110 species in 96 genera and 42 plant families were recorded from the study identified (Table 1). In all, the family Asteraceae was dominant with 9 genera and 10 species, respectively (Table 2). This was followed by Euphorbiaceae and Poaceae (7genera, 8 species each),

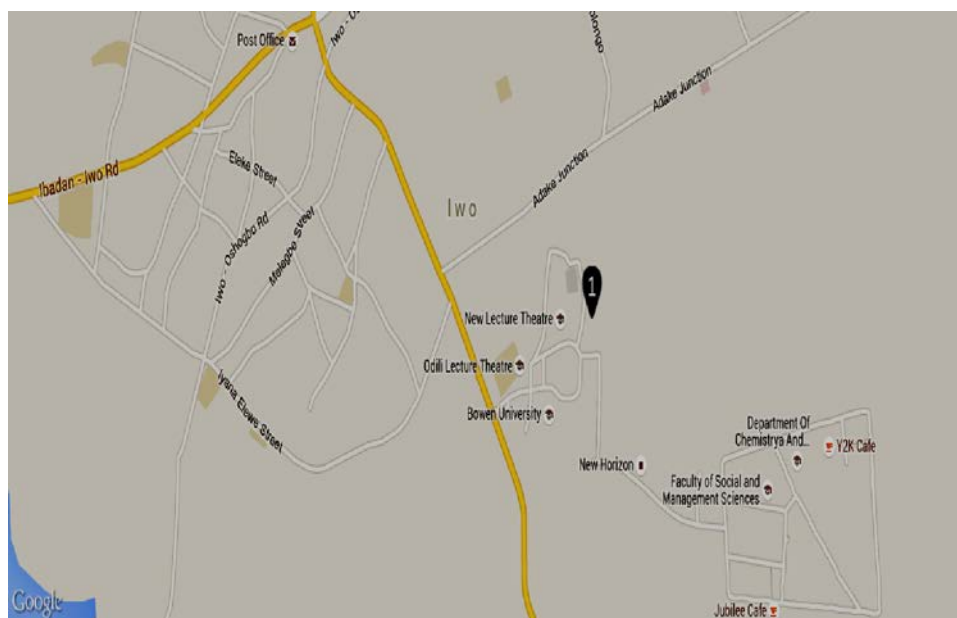


Fig. 1: Location map of the study area (source: Google map, 2015)

Table 1: A formatted list of plant species within the study area

Families/species	Voucher No.	Habit	Common name	Local name
Acanthaceae				
<i>Acanthus montanus</i> (Nees) T. Anders.	No voucher	Shrub	White's ginger	Irunmu-arugbo
<i>Asystasia gangetica</i> (L.) T. Anders.	BUH049	Herb	Orange hawkweed	Lobiiri
<i>Justicia flava</i> (Forsk.) Vahl.	No voucher	Herb	Bankas	Oridun
Amaranthaceae				
<i>Achryantes aspera</i> L.	No voucher	Herb	Rough-chaff tree	Aboro
<i>Alternanthera sessilis</i> (L.) D.C.	No voucher	Herb	Sessile joy-weed	Saje/ ewe owo
<i>Amaranthus spinosus</i> L.	No voucher	Herb	Thorny-pigweed	Tete elegun
<i>Amaranthus viridis</i> L.	No voucher	Herb	Pigweed	Tete abalaye
<i>Cyathula protata</i> (L.) Blume	BUH057	Herb	Pasture weed	Shawere pepe
<i>Gomphrena celosioides</i> Mart.	BUH052	Herb	Batchelor's button	Ipopo ale
Anacardiaceae				
<i>Anacardium occidentale</i> L.	No voucher	Tree	Cashew tree	Caju
<i>Lannea welwitschii</i> (Hirn) Engl.	No voucher	Tree	-	-
<i>Mangifera indica</i> L.	No voucher	Tree	Mango tree	Mango
Annonaceae				
<i>Annona senegalensis</i> Pers.	No voucher	Tree	African custard apple	Abo
Apocynaceae				
<i>Holarrhena floribunda</i> (G.Don.) Dur.	No voucher	Tree	False rubber tree	Ako-ire, irena
<i>Plumeria alba</i> L.	No voucher	Tree	Caterpillar tree	-
<i>Plumeria rubra</i> L.	No voucher	Tree	Frangipani, Temple tree	-
<i>Thevetia peruviana</i> Schum.	No voucher	Shrub	Mexican oleander	Olomiojo
Arecaceae				
<i>Cocos nucifera</i> L.	No voucher	Tree	Coconut	Agbon
<i>Elaeis guineense</i> Jacq.	No voucher	Tree	Palm tree	Ope
<i>Oreodoxa oleracea</i> Mart.	No voucher	Tree	Royal palm	-
Asteraceae				
<i>Ageratum conyzoides</i> L.	BUH056	Herb	Goat weed	Imi-esu
<i>Aspillia africana</i> (Pers.) C.D. Adams	BUH059	Herb	Haemorrhage plant	Yunyun
<i>Bidens pilosa</i> L.	No voucher	Herb	Spanish needle	Abere-oloko
<i>Chromolaena odorata</i> (L.) R.M. King and Robinson	BUH054	Herb	Akintola weed	Akintolataku
<i>Emilia pratensis</i> Milne-Redhead.	BUH061	Herb	Tassel flower	Odundun-owo
<i>Syndrella nodiflora</i> Geartn.	BUH045	Herb	Syndrella	Tonaposo
<i>Tithonia diversifolia</i> (Hemsl.) A. Gray	BUH060	Herb	Mexican sunflower	Agbale,jogbo
<i>Tridax procumbens</i> L.	BUH053	Herb	Tridax	Igbelode
<i>Vernonia amygdalina</i> Del.	No voucher	Shrub	Bitter leaf	Ewuro
<i>Vernonia cinera</i> (L.) Less.	No voucher	Herb	Ash coloured fleabane	Bojure
Bignoniaceae				
<i>Crescentia cujete</i> L.	No voucher	Shrub	Calabash tree	Igi-igba
<i>Jacaranda mimosifolia</i> D.Don	No voucher	Tree	Jacaranda	-
<i>Newbouldia laevis</i> Seem.	No voucher	Tree	Tree of life	Ewe akoko
<i>Stereospermum kunthianum</i> Cham.	No voucher	Tree	Pink Jacaranda	-
Bombacaceae				
<i>Bombax buonopozense</i> P. Beauv.	No voucher	Tree	Red silk cotton tree	Ponpola
Caricaceae				
<i>Carica papaya</i> L.	No voucher	Shrub	Pawpaw	Ibepe
Casuarinaceae				
<i>Casuarina equisetifolia</i> Forsk.	No voucher	Tree	Whispering pine	-
Cleomaceae				
<i>Cleome ruidosperma</i> DC.	No voucher	Herb	Wild mustard	Akuya-aaja
<i>Cleome viscosa</i> L.	No voucher	Herb	Consumption weed	Ekuya
Combretaceae				
<i>Terminalia catappa</i> L.	No voucher	Tree	Almond	Furutu
Convolvulaceae				
<i>Ipomoea carnea</i> Jacq.	No voucher	Shrub	Pink morning glory	-
Cucurbitaceae				
<i>Luffa cylindrica</i> (L.) DC.	No voucher	Climber	Loofah gourd	Kankan oyinbo
<i>Momordica charantia</i> L.	No voucher	Climber	African cucumber	Ejinrin

Table 1: Continue

Families/species	Voucher No.	Habit	Common name	Local name
Cyperaceae				
<i>Cyperus esculenta</i> L.	No voucher	Grass	Yellow nutsedge	Ofiolomu
<i>Cyperus rotundus</i> L.	No voucher	Grass	Purple nutsedge	Abo-keregun
<i>Killingia pumila</i> Michx.	No voucher	Grass	Spike sedges	-
<i>Mariscus alternifolius</i> Vahl.	BUH048	Grass	Mariscus	Alubosa-eranko
Euphorbiaceae				
<i>Acalypha fimbriata</i> Schum et Thonn.	No voucher	Herb	Copper-leaf plant	Jiwinni
<i>Bridelia ferruginea</i> Benth	No voucher	Tree		Ira-odan
<i>Codiaeum variegatum</i> (L.) Blume	No voucher	Shrub	Garden croton	-
<i>Croton lobatus</i> L.	No voucher	Herb	Cascarilla	Eru
<i>Euphorbia hirta</i> L.	BUH058	Herb	Garden-spurge	Emile
<i>Euphorbia heterophylla</i> L.	No voucher	Herb	Spurge-weed	
<i>Margaritaria discoidea</i> (Baill.) Webs	No voucher	Tree	Common pheasant-berry	Awe, alawe
Lamiaceae				
<i>Hyptis lanceolata</i> Poir.	No voucher	Herb	Black sesame	-
<i>Platostoma africanum</i> P. Beauv.	No voucher	Herb	-	-
<i>Solenostemon monostachyus</i> (P.Beauv.) Brig.	No voucher	Herb	Catnip	Aranpolo
Lauraceae				
<i>Persea americana</i> Mill.	No voucher	Tree	Avocado pear	Pia
Leguminosae-Caesalpinioideae				
<i>Delonix regia</i> Raf.	No voucher	Tree	Flame of the forest, flamboyant	Seke seke, ayin
<i>Senna siamea</i> (Lam.) H.S.Irwin and Barneby	No voucher	Tree	Cassia	-
<i>Senna sinqueana</i> (Delile) Lock	No voucher	Tree	Winter cassia	-
<i>Tamarindus indica</i> L.	No voucher	Tree	Tamarind	Ajagbon, pala
Leguminosae-Mimosoideae				
<i>Albizia lebbbeck</i> Benth.	No voucher	Tree	Silk flower	Igbagbo
<i>Leucaena leucocephala</i> (Lam.) de Wit.	No voucher	Tree	white leadtree	-
<i>Parkia biglobosa</i> (Jacq.) Benth.	No voucher	Tree	Locust bean tree	Igi igba
Leguminosae-Papilionoideae				
<i>Gliricidia sepium</i> (Jacq.) Walp.	No voucher	Tree	Quickstick	Agunmaniye
Loganiaceae				
<i>Anthocleista vogelli</i> Planch.	No voucher	Tree	Cabbage tree	Apa oro, sapo
Lythraceae				
<i>Lagerstroemia tomentosa</i> L.	No voucher	Tree	White Crape Myrtle	-
Malvaceae				
<i>Hibiscus rosa-sinensis</i> L.	No voucher	Shrub	Rose	Kekeke, Ireagu
<i>Sida acuta</i> Burm. f.	BUH051	Herb	Broom weed	Osekotu
<i>Sida corymbosa</i> R.E. Fries.	BUH046	Herb	-	Isekotu
Meliaceae				
<i>Azadirachta indica</i> A. Juss.	No voucher	Tree	Neem tree	Dogoyaro
<i>Trichillia emetica</i> Vahl.	No voucher	Tree	Natal-mahogany	Isin-oko
<i>Trichillia prieuriana</i> A. Juss.	No voucher	Tree	-	Urere
Moraceae				
<i>Ficus exasperata</i> Thunb.	No voucher	Tree	Sandpaper tree	Epin
<i>Ficus polita</i> Vahl.	No voucher	Tree	Polish fig	-
<i>Ficus sur</i> Forssk.	No voucher	Tree	Broom-cluster fig	Opoto
<i>Ficus thonningii</i> Blume.	No voucher	Tree	Wild fig	Odan abaa
Musaceae				
<i>Musa sapientum</i> L. subsp. <i>paradisiaca</i>	No voucher	Shrub	Plantain	Ogede agbagba
<i>Musa sapientum</i> L. subsp. <i>sapientum</i>	No voucher	Shrub	Banana	Ogede omimi
Myrtaceae				
<i>Eugenia unifolia</i> L.	No voucher	Shrub	Pitanga cherry	-
<i>Psidium guajava</i> L.	No voucher	Tree	Guava	Gorofa
Pinaceae				
<i>Pinus caribaea</i> (Senecl.) W.H. Barrett et Golfari	No voucher	Tree	Christmas tree	-
Piperaceae				
<i>Peperomia pellucida</i> (L.) H.B.	No voucher	Herb	Cow foot	Rinrin

Table 1: Continue

Families/species	Voucher No.	Habit	Common name	Local name
Poaceae				
<i>Andropogon tectorum</i> Schum. and Thonn.	No voucher	Shrub	Horse grass	Eruwa-dudu
<i>Bambusa vulgaris</i> Schrad.	No voucher	Shrub	Bamboo	Oparun
<i>Chloris pilosa</i> Schumach	No voucher	Grass	Finger grass	Eeran
<i>Elusine indica</i> Gaertn.	No voucher	Grass	Goose grass	Gbegi
<i>Eragrostis atrovirens</i> (Desf.) Trin. ex. Steud.	No voucher	Grass	Wire lovegrass	Iyabu
<i>Eragrostis tremula</i> Hochst.	No voucher	Grass	Love grass	Ariran, agbado-esin
<i>Pennisetum pedicellatum</i> Trin.	BUH044	Grass	Matting grass	Esu
<i>Sporobolus pyramidalis</i> P. Beauv.	BUH050	Grass	Drop seed grass	-
<i>Talinum triangulare</i> (Jacq.)	No voucher	Herb	Water-leaf	Gbure
Rubiaceae				
<i>Morinda lucida</i> Benth.	No voucher	Tree	Brimstone-tree	Oruwo
Rutaceae				
<i>Citrus sinensis</i> Osbeck	No voucher	Tree	Sweet orange	Osan mimu
<i>Murraya koenigii</i> (L.) Spreng.	No voucher	Shrub	Curry leaf tree	Ebafo
Sapindaceae				
<i>Allophylus africana</i> P. Beauv.	No voucher	Tree	-	-
<i>Blighia sapida</i> Koenig	No voucher	Tree	Akee aple	Ishin
<i>Dodonaea viscosa</i> L.	No voucher	Shrub	Hopbush	-
Solanaceae				
<i>Physalis angulata</i> L.	No voucher	Herb	Ground angular cherry	Koropo
Sterculiaceae				
<i>Cola nitida</i> (Vent.) Schott. et Endl.	No voucher	Tree	Colanut	Obi
Urticaceae				
<i>Laportea aestuans</i> (L.) Chev.	No voucher	Herb	Tropical nettle weed	Fiyafiya
Verbenaceae				
<i>Duranta repens</i> L.	No voucher	Shrub	Yellow bush	-
<i>Gmelina arborea</i> L.	No voucher	Tree	Gmelina tree	Igi melina
<i>Stachytarpheta cayennensis</i> (Rich) Schau	BUH055	Herb	Rat tail verveine	Agogo-igun
<i>Tectona grandis</i> L.	No voucher	Tree	Teak	Igi-gedu
<i>Vitex doniana</i> Sweet.	No voucher	Tree	Black plum	Oori-nla

Amaranthaceae (5 genera, 6 species) and Verbenaceae (5 genera and 5 species), respectively. As observed, a number of plant families also have only one species represented in each genus/genera as the case may be. Their existence also reflects the previously rich biodiversity existing within the university premises prior to developmental activities. In general, a total of 84 genera were represented with only 1 species each while the remaining 12 had more than one species represented. Of these 10, only *Ficus* was represented with 4 species and the others had two each. Further results based on the life forms of these plant species also revealed that the study area is dominated by trees, as they constitute 42.73% (47 species) of the total enumeration. This was closely followed by the herbs, with 34 species (30.91%) and the shrubs with 17 species (15.45%) while the grasses contributed 9.09% (Fig. 2). Occurrence of the climbers (<2%) however is also an indication of their role in ecosystem maintenance.

It is noteworthy that the legumes contributed 8 species (Caesalpinioideae-4, Mimosoideae-3 and Papilionoideae-1) and these are all trees. The absence of other plant habits within this group, especially shrubs and climbers is surprising and points to urbanization as a big threat to species diversity within and outside the study area. Interestingly, of all the 47 plant families identified (Fig. 3), the trees are dominant and are represented in 25 of these angiosperm families, followed by the shrubs in 15 families and the herbs in 12 families. The grasses and climbers are also represented in 2 and 1 families, respectively as shown in Fig. 4.

The avalanche of species, especially trees and herbs, as recorded in this work is an indication that the study area is home to many plant species that could be screened for medicinal

Table 2: Occurrence of genera and species within the respective plant families

Families	No. of genus/genera	No. of species
Acanthaceae	3	3
Amaranthaceae	5	6
Anacardiaceae	3	3
Annonaceae	1	1
Apocynaceae	3	4
Arecaceae	3	3
Asteraceae	9	10
Bignoniaceae	4	4
Bombacaceae	1	1
Caricaceae	1	1
Casuarinaceae	1	1
Cleomaceae	2	2
Combretaceae	1	1
Convulvulaceae	1	1
Cucurbitaceae	2	2
Cyperaceae	3	4
Euphorbiaceae	7	8
Guttiferae	1	1
Hymenocardiaceae	1	1
Lamiaceae	3	3
Lauraceae	1	1
Leguminosae-Caesalpinioideae	3	4
Leguminosae-Mimosoideae	3	3
Leguminosae-Papilionoideae	1	1
Loganiaceae	1	1
Lythraceae	1	1
Malvaceae	2	3
Meliaceae	2	3
Moraceae	1	4
Musaceae	1	2
Myrtaceae	2	2
Pinaceae	1	1
Piperaceae	1	1
Poaceae	7	8
Portulacaceae	1	1
Rubiaceae	1	1
Rutaceae	2	2
Sapindaceae	3	3
Solanaceae	1	1
Sterculiaceae	1	1
Urticaceae	1	1
Verbenaceae	5	5
Total	97	110

properties, thus reflecting the biodiversity richness of the study area and the neighbouring communities at large. Some of these species have been reported by some authors of medicinal plants studies (Okoli *et al.*, 2007; Odugbemi, 2008) to mention but a few. A number of them also serve economic purposes and are consumed as food in one way or the other. Some of these include: *Amaranthus viridis*, *Blighia sapida*, *Carica papaya*, *Cocos nucifera*, *Mangifera indica*, *Musa sapientum*, *Parkia biglobosa*, *Vernonia amygdalina*, etc. This justifies the importance of plant species in the maintenance of ecosystem and as a source of livelihood for man. The parallel venation (in the leaves) exhibited by *Calophyllum inophyllum* is an interesting feature which should also encourage the protection of this dicot species possessing a monocot characteristics, although it was introduced to our region but now naturalized.

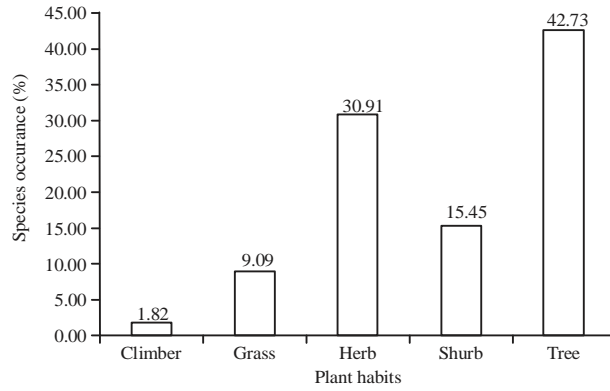


Fig. 2: Percentage of species occurrence within the identified plant habits

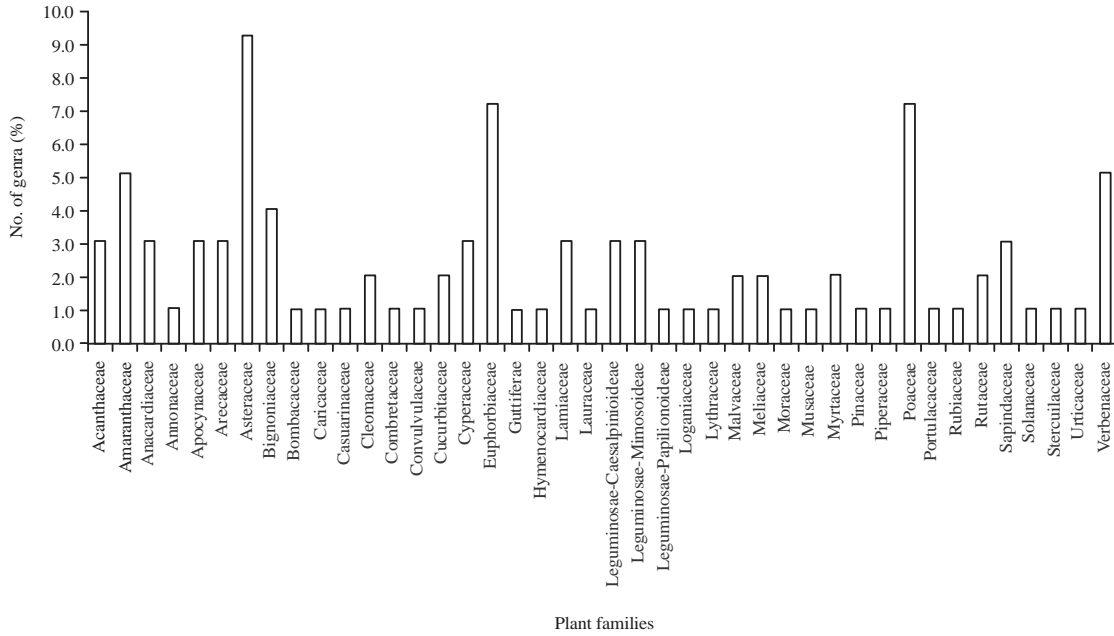


Fig. 3: Percentage distribution of genera across plant families

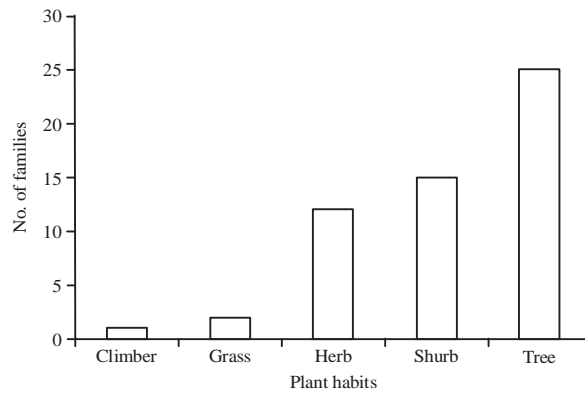


Fig. 4: No. of families represented by each plant habit

Apart from the present study, several authors have also documented the existing angiosperm species in some parts of the country (Bamidele *et al.*, 2011; Soladoye *et al.*, 2011; Ariwaodo *et al.*, 2012). Nevertheless, the reports by Gbile *et al.* (1981) and Oguntala *et al.* (1996) are some indications that the Nigerian ecosystems are at greater risk if urgent attention is not given.

CONCLUSION

This study has clearly shown the importance of biodiversity assessment and monitoring in Nigeria and the world at large. The numerous species recorded suggest the need for the establishment of arboretum and botanical garden within and outside the study area, for the purpose of *ex-situ* conservation. It also suggests a close monitoring of the university ecosystem by the appropriate authorities to checkmate the indiscriminate application of herbicides, which is also a contributory factor to species loss.

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