

CHECKLIST OF TREES AND SHRUBS AT THE NARAGUTA CAMPUS OF THE UNIVERSITY OF JOS

ABSTRACT

Aims: To identify and document the trees and shrubs found in the Naraguta Campus of the University of Jos.

Study design: Systematic randomized sampling.

Place and Duration of Study: University of Jos Naraguta campus, between March 2020 and April 2020.

Methodology: A ten (10) 50 x 50 m plots were established and each being at least 250m apart using measuring tape to obtain data on the trees and shrubs of the area. The coordinates for the points where plots occur were recorded using Garming Extrax Global Positioning System (GPS) machine.

Results: A total of sixty three (63) species, belonging to thirty (30) families were recorded during the study. The most species abundant families were the *Anacardiaceae*, *Apocynaceae*, *Caesalpinaceae*, *Mimoseceae*, *Moraceae*, *Myrtaceae* and *Annonaceae* respectively.

Conclusion: To conclude, this research work has revealed the diversity of trees and shrubs in the Naraguta campus of the University of Jos, alongside their local names, common names, families, and locations.

Keywords: Checklist, trees, shrubs, woody plants.

1. INTRODUCTION

Plant diversity is abundant in African countries, including Nigeria, and many species are employed as traditional remedies, ornamentals, fuels, and other products [1]. Plants are a vital kingdom of organisms. They're multicellular organisms with the incredible ability to produce their own sustenance from

atmospheric carbon dioxide [2]. Plants are the foundation of many food webs, and without them, animal life would not exist. Natural ecosystems in Africa are home to a large portion of the world's biodiversity and generate a significant amount of foreign exchange for the continent through tourism [3]. Tropical forests are being deforested at an alarming

rate. Plant diversity is under threat when forest cover is destroyed without even understanding what species are present. Deforestation is often regarded as the world's most serious environmental and economic issue [4]. Anthropogenic factors are the primary causes of deforestation and degradation of land and forest resources [5].

A tree is a perennial plant with an elongated stem, or trunk, supporting branches and leaves in most species. In some contexts, the definition of a tree may be narrower, encompassing only woody plants with secondary growth, plants suitable for lumber production, or plants taller than a certain height [6]. In wider definitions, the taller palms, tree ferns, bananas, and bamboo are also trees. Trees are not a taxonomic group but include a variety of plant species that have independently evolved a trunk and branches as a way to tower above other plants to compete for sunlight [7]. Trees tend to be long-lived, some reaching several thousand years old. Trees have been in existence for 370 million years. It is estimated that there are just over 3 trillion mature trees in the world [8].

Richardson [9] defines shrubs as perennial woody plants having persistent woody stems above ground [as opposed to herbaceous plants]. Shrubs and trees are usually identified by their height and many stems. Some shrubs [e.g., hawthorn] are deciduous, while others [e.g., holly] are evergreen [10].

Trees, shrubs, and lianas are all examples of woody plants. A plant that produces wood as its structural tissue is known as a woody plant. These are mainly perennial plants with secondary xylem wood reinforcing their stems and bigger roots [11]. A coating

of bark normally covers the main stem, bigger branches, and roots of these plants. Wood is a structural substance that allows woody plants to grow year after year from above-ground stems, making some of them the largest and tallest terrestrial plants [12].

There appears to have been a recent surge in interest in African flora conservation [13]. In Nigeria, Africa's most populous country, such conservation studies are nevertheless dying a slow death. Currently, there is a dearth of an adequate database on the botanicals that are available in the country [14]. As a result, species once thought to be abundant may be on the verge of extinction, while species once thought to be endangered may be on the verge of extinction [15]. At the University of Jos' Naraguta campus, many research initiatives on a plant checklist have been carried out, which is incredibly essential since they give a baseline for future research, even if it is focused on specific plant species or families.

However, there is a scarcity of documented data on the trees and shrubs at the survey site. This research is critical in order to create a database of trees and plants found on the University of Jos' Naraguta Campus. This will contribute to the floristic studies and biodiversity conservation in the university. The present study has the following objectives:

1. To identify the different species of trees and shrubs in the Naraguta Campus of the University of Jos.
2. To collect and preserve the specimens for vouchers in the herbarium of Plant Science and Biotechnology department.

2. MATERIALS AND METHODS

2.1 Study Area

The University of Jos Naraguta Campus is located in Jos, the capital of Plateau State, with a latitude of 9.9496° or 9° 56' 58.7" north and a longitude of 8.8895° or 8° 53' 22.3" east, with an elevation of 1173 meters [3848 feet] in north-central Nigeria. The average annual temperature is 22.8° Celsius (73° Fahrenheit). The annual rainfall is 1324 mm (52.1 inches).

2.2 Sampling Design

A systematic random sampling technique was employed [16]. Ten (10) 50 x 50 m plots were established [each being at least 250 m apart using a measuring tape. The coordinates for plot points were obtained using the Garmin Extrax® Global Positioning System (GPS).

2.2.1 Specimen Collection and Identification

In each plot, the various trees and shrubs [plants] species encountered were taxonomically identified and recorded. During sampling and collection of specimens, the following parameters were noted and recorded: the scientific name, family, location, common name, and the number of individuals encountered.

2.3 Herbarium Specimens

Herbarium specimens were collected from each plot, and the number of individuals was counted. The specimens were taxonomically identified based on relevant literature [17], field notes, and with a curator guidance during field sample collection.

2.3 Determination of Species Frequency

Data collected from the field were analyzed using a modified method used by Stephen [18].

3. RESULTS

A total of sixty-three (63) species, belonging to thirty (30) families, were recorded during this study. Two hundred and forty-three (243) individual species were recorded during the study. The most species-abundant

families were found to be the *Anacardiaceae*, *Apocynaceae*, *Caesalpinaceae*, *Mimosaceae*, *Moraceae*, *Myrtaceae*, and *Annonaceae*. A comprehensive check list of all plants recorded including the percentage occurrence of each species is given below in Table 1 and table 2 respectively

Table 1: Scientific name, Family, Common Name and Habit of the plant species recorded at the Naraguta Campus of the University of Jos.

S/N	Scientific Name	Family	Common Name	Habit
1	<i>Acacia polyacantha</i> (Willd) Seigler & Ebinger	Mimosaceae	White catechu	Tree

2	<i>Acacia seiberiana</i> (DC.) Kyal. & Boatwr	Mimosaceae	Paperback	Tree
3	<i>Agave sissalina</i> L.	Asparagaceae	Century plant	Shrub
4	<i>Anacardium occidentale</i> L.	Anacardiaceae	Cashew	Tree
5	<i>Annona senegalensis</i> Pers.	Annonaceae	African custard	Shrub
6	<i>Azadirachta indica</i> A. Juss	Meliaceae	Neem	Tree
7	<i>Bixa orellana</i> L.	Bixaceae	Achiote or bijol	Shrub
8	<i>Bombax costatum</i> Pellegr. & Vuillet.	Malvaceae	Kapok	Tree
9	<i>Borassus aethiopum</i> Mart	Arecaceae	Fan palm	Tree
10	<i>Breonadia microphala</i> (Delile) Ridsdale	Rubiaceae		Tree
11	<i>Canarium shweinfurthii</i> Engl.	Burseraceae	Bush candle	Tree
12	<i>Carissa edulis</i> Vahl	Apocynaceae	Carandas plum	Shrub
13	<i>Citrus sinensis</i> L.	Rutaceae	Sweet orange	Tree
14	<i>Clerodendrum capitatum</i> Schumach. & Thonn.	Lamiaceae	Bagflower/ bleeding-heart.	Tree
15	<i>Clerodendrum trichotomum</i> L.	Lamiaceae	harlequin glorybower	Shrub
16	<i>Combretum nigricans</i> Lepr. ex Guill. & Perrot.	Combretaceae	Bushwillow	Tree
18	<i>Corymbia torelliana</i> (F.Muell.) K.D.Hill	Myrtaceae	Cadaghi or Cadaga	Tree
19	<i>Cussonia arborea</i> Hochst	Araliaceae	Octopus Cabbage Tree	Tree
20	<i>Delonix regia</i> (Hook.) Raf.	Caesalpinaceae	Flamboyant tree	Tree
21	<i>Ekebergia senegalensis</i> A Juss.	Meliaceae	Cape ash, dogplum	Tree
22	<i>Elaeis guinensis</i> Jacq.	Arecaceae	Oil palm	Tree
23	<i>Entada africana</i> Guill. & Perr.	Mimosaceae	Tawatsa	Tree
24	<i>Erythrina senegalensis</i> DC.	Fabaceae	Cora tree	Tree
25	<i>Eucalyptus camaldulensis</i> Dehnh.	Myrtaceae	Rive red gum	Tree
26	<i>Euphorbia kamerunica</i> Pax	Euphorbiaceae	Suru	Shrub
27	<i>Ficus exasperate</i> Vahl	Moraceae	Sand paper tree	Tree
28	<i>Ficus ingens</i> (Miq.) Miq.	Moraceae	Red leaved rock	Tree
29	<i>Ficus platyphylla</i> Del.	Moraceae	Broad leaf fig	Tree
30	<i>Ficus sycomorus</i> L.	Moraceae	Sycomore	Tree
31	<i>Fluegea virosa</i> (Roxb. ex Willd.) Voigt	Phyllanthaceae	White berry bust	Shrub
32	<i>Grewia mollis</i> Hochst. ex A.Rich.	Tiliaceae	Common lettuce	Tree

33	<i>Hergenia abyssinica</i> (Bruce) J.F.Gmel.	Fabaceae		Tree
34	<i>Ipomoea asarifolia</i> (Desr.) Roem. & Schult.	Convovulaceae	Ginger leaf morning glory	Shrub
35	<i>Jacaranda mimosifolia</i> D. Don	Bignoniaceae	Blue jacaranda	Tree
36	<i>Khaya senegalensis</i> (Desr.)	Meliaceae	African Manhogany	Tree
37	<i>Lantana camara</i> L.	Verbenaceae	big sage, wild sage	Shrub
38	<i>Mangifera indica</i> L.	Anacardiaceae	Mango	Tree
39	<i>Morinda citrifolia</i> L.	Apocynaceae	Indian mulberry	Shrub
40	<i>Moringa oliefera</i> Lam.	Moringaceae	Moringa	Tree
41	<i>Musa sapientum</i> L.	Musaceae	Banana	Shrub
42	<i>Ochna shweinfurthiana</i> L.	Ochnaceae	Brick-red Ochna	Tree
43	<i>Ozoroa insignis</i> (Del.) Kuntz	Anacardiaceae	Muacha	Shrub
44	<i>Phoenix reclinata</i> L.	Arecaceae	Wild date palm	Tree
46	<i>Plumeia rubra</i> L.	Apocynaceae	Red paucipan	Tree
47	<i>Plumeria alba</i> L.	Apocynaceae	Fangipani	Shrub
48	<i>Psidium guajava</i> L.	Myrtaceae	Guava	Tree
49	<i>Rhus longipes</i> Engl.	Anacardiaceae	Rhus	Shrub
50	<i>Sapium elipticum</i> (Hochst.) Pax	Apocynaceae	Jumping seed tree	Tree
51	<i>Senna saimea</i> (Lam.) H.S. Irwin & Barneby	Caesalpinaceae	Kassod tree	Tree
52	<i>Senna singueana</i> (Del.) Lock.	Fabaceae	Winter cassia, Sticky pod	Tree
53	<i>Spondias purpurea</i> L.	Anacardiaceae	Red mombin or plum	Tree
54	<i>Stereospermum kunthianum</i> Cham.	Bignoniaceae	Pink Jacaranda	Shrub
55	<i>Syzygium guineense</i> (Willd.) DC.	Myrtaceae	Jamun or jambu	Tree
56	<i>Tamarindus indica</i> L.	Caesalpinaceae	Tamarind	Tree
57	<i>Terminalia laxiflora</i> Engl.	Combretaceae		Tree
58	<i>Terminalia avicennoides</i> Guill & Perr	Combretaceae	Bambara: Wolobugan	Tree
59	<i>Thuja plicata</i> L.	Cupressaceae	Western red cedar	Tree
60	<i>Uvaria chamae</i> P. Beauv.	Annonaceae	finger root	Shrub
61	<i>Vachellia sieberiana</i> (DC.) Kyal. & Boatwr.	Mimosaceae	Paper bark thorn	Tree
62	<i>Vernonia adoensis</i> Sch. Bip.	Asteraceae	Musikavakadzi	Shrub
63	<i>Vitex doniana</i> L.	Verbenaceae	Black plum	Tree

Table 2: The Family Percentage Frequency and the number of plants count per family recorded at the Naraguta Campus of the University of Jos.

S/N	Family	No of individual species	Percentage frequency of individual species
1	<i>Anacardiaceae</i>	26	10.69
2	<i>Annonaceae</i>	11	4.53
3	<i>Apocynaceae</i>	10	4.12
4	<i>Araliaceae</i>	6	2.46
5	<i>Arecaceae</i>	25	10.28
6	<i>Asparagaceae</i>	2	0.82
7	<i>Asteraceae</i>	2	0.82
8	<i>Bignoniaceae</i>	5	2.05
9	<i>Bixaceae</i>	2	0.82
10	<i>Burseraceae</i>	1	0.41

11	<i>Caesalpinaceae</i>	18	7.40
12	<i>Combretaceae</i>	15	6.17
13	<i>Convolvulaceae</i>	6	2.46
14	<i>Cupressaceae</i>	2	0.82
15	<i>Euphorbiaceae</i>	3	1.23
16	<i>Fabaceae</i>	6	2.46
17	<i>Lamiaceae</i>	11	4.53
18	<i>Malvaceae</i>	10	4.11
19	<i>Meliaceae</i>	5	2.05
20	<i>Mimosaceae</i>	6	2.46
21	<i>Moraceae</i>	6	2.46
22	<i>Moringaceae</i>	5	2.05
23	<i>Musaceae</i>	10	4.12
24	<i>Myrtaceae</i>	38	15.63
25	<i>Ochnaceae</i>	1	0.41
26	<i>Phyllanthaceae</i>	1	0.41
27	<i>Rubiaceae</i>	1	0.41
28	<i>Rutaceae</i>	3	1.23
29	<i>Taliaceae</i>	3	1.23
30	<i>Verbenaceae</i>	5	2.05
Total		243	100

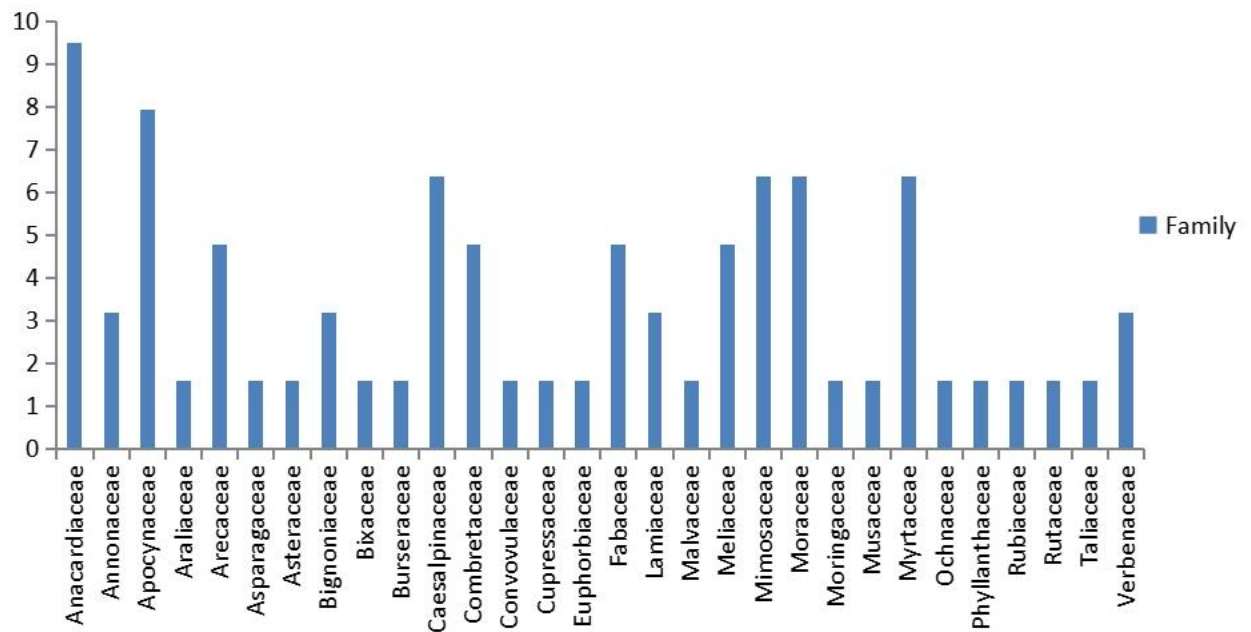


Figure 1: Frequency of plants per family

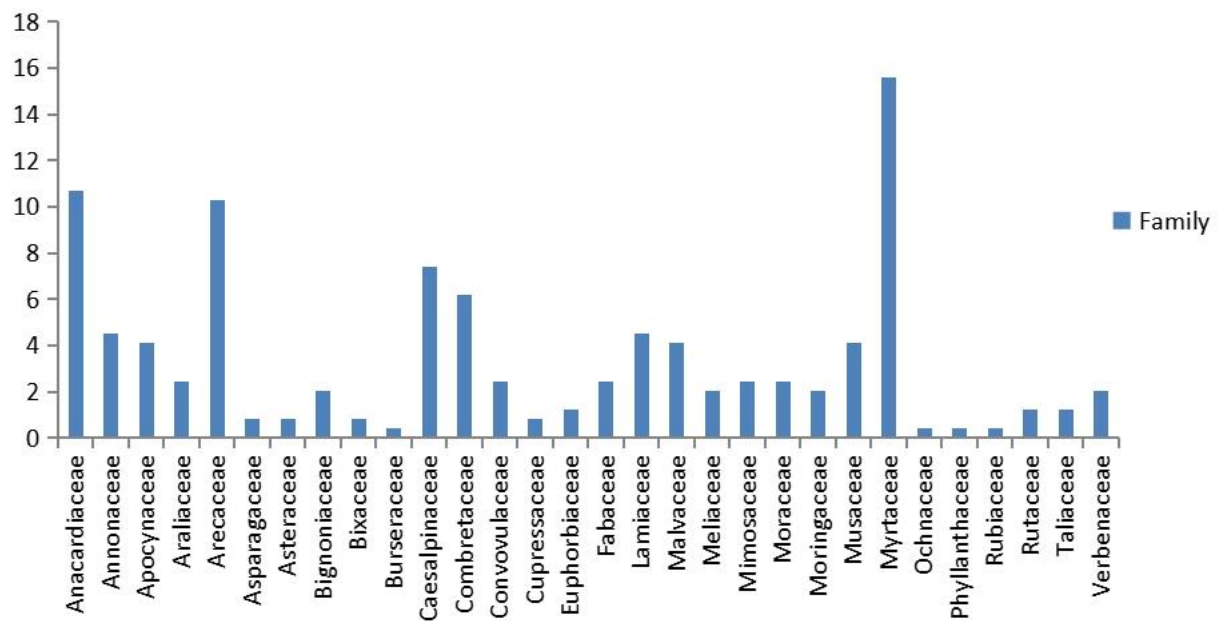


Figure 2: The number of plants specie recorded per family

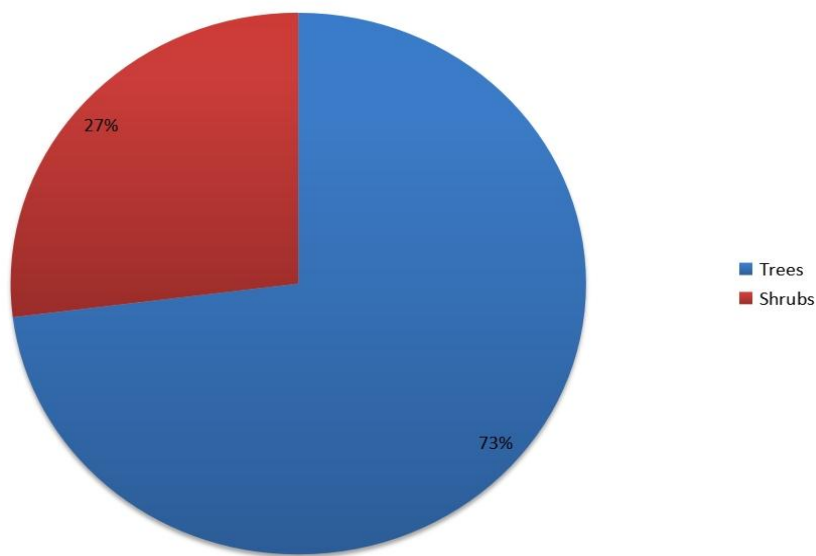


Figure 3: The percentage of trees and shrubs recorded

4. DISCUSSION

From the study it is discovered that out of the 30 families' recorded, the most species abundant families were the Anacardiaceae, Apocynaceae, Caesalpinaceae, Mimosaceae, Moraceae, Myrtaceae and Annonaceae which accounts for 57% of species abundance. The Anacardiaceae family, according to the study, has a significant number of individual species, with twenty-six (26) since some are evergreen while others are deciduous, and in terms of their habits as trees, shrubs, and woody vines, which allows them to adapt. Most members of the Anacardiaceae family are native to tropical and subtropical regions of the world, with about 80 genera and 870 species. [19]. The reason for the poor establishment of some families may be attributed to anthropogenic activities in the study area [20]. While *Mangifera indica*, *Borassus aethiopum*, *Senna singueana*, and *Psidium gaujava* were the most abundant species. This study also revealed that, in the naraguta campus of the University of Jos, trees are more abundant than shrubs, this is most likely because of the fact that, most of the shrubs are perennials and are mostly found growing during the rainy season while some *deciduous* tree(s) like *Bombax costatum* that usually grows 10 - 25 metres tall, was found with flowers with no leaves. The plant(s). lose

their leaves to conserve water or to better survive during the dry season The plant belongs to a small family of flowering plants which contains about 28 genera and 200 species [21]. All the trees in the study area were terrestrial due to the climatic condition of the study area [22]. These results in tandem with the report of Osawaru [23] where mostly woody plants were found in the study site [24] [25].

5. CONCLUSION

This study has revealed the ever first documentation on diversity of trees and shrubs in the Naraguta campus of the University of Jos, alongside their local names, common names, families, and locations. The checklist and voucher specimens provided can be used as reference material for future studies on enhancing the conservation and biodiversity of trees and shrubs at the University of Jos.

6. RECOMMENDATION

This study should be expanded, and the university should find a mechanism to conserve these plants, as some of them may become extinct in the near future if sufficient care is not given. In addition, strict regulations should be enacted to prevent activities like bush burning, illicit logging, and illegal grazing.

REFERENCES

1. Ajao A. (2012). *Harnessing Nigeria's biological diversity in an integrated approach to national development*. JORIND, 10 (2) 40-45.
2. Emma-Okafor, L., Chinenye, I., Izuchukwu, I. and Obiefuna, J. C. (2010). *Biodiversity Conservation for Sustainable Agriculture in Tropical Rainforest of Nigeria*. New York Science Journal, 3(1) 81-88
3. Borokini T. I., Okere A. U., Giwa A. O, Daramola B. O. and Odojin W.T. (2010). *Biodiversity and conservation of plant genetic resources in Field Genebank of the National Centre for Genetic Resources and Biotechnology*, Ibadan, Nigeria. International Journal of Biodiversity and Conservation, 2(3) 037-050.
4. Anthony Young, (2003). Global Environmental out looks 3 (Geo 3): Past present and future perspective. *The Geographical Journal*, Vol. 169: pp 120-125.
5. Thecla M. Muta (2009). Biodiversity conservation presentation of the Short cause IV on exploration for Geothermal resources, organized by UNO- GTp, Karhlan and GDC, at lake Naivosha, Kenya, November 1-22.
6. Hodson, Martin J.; Bryant, John A. (2012). *Functional Biology of Plants*. pp. 9–11. ISBN 978-1-119-96887-0.

7. Millennium Ecosystem Assessment. (2005). Forests, climate change, biodiversity and land degradation. Report on Joint liaison group of the Rio
8. conventions. Brazil. 10.
9. Crowther, T. W., Glick, H. B.; Covey, K. R.; Bettigole, C.; Maynard, D. S.; Thomas, S. M.; Smith, J. R.; Hintler, G.; Duguid, M. C. (2015). "Mapping tree density at a global scale". *Nature. advance online publication* (7568): 201–205.
10. Richardson, David. (2011). Trees and shrubs. Encyclopedia of biological invasions. 670-677.
11. Allaby W, Jones, TA, Powell, W. and Brown (2019) *Nature Plants* 5: 337-338
12. Friis, Ib; Balslev, Henrik; Kongelige, Danske; Videnskabernes, Selskab (eds.) (2005). *Plant diversity and complexity patterns: local, regional, and global dimensions: proceedings of an international symposium held at the Royal Danish Academy of Sciences and Letters in Copenhagen, Denmark*. pp. 57–59. [ISBN 978-87-7304-304-2](#).
13. Bonner, F. T., and Robert P. Karrfalt , (2008). *The Woody Plant Seed Manual*. [Washington, D.C.]: U.S. Dept. of Agriculture, Forest Service <https://purl.fdlp.gov/GPO/LPS113557>
14. Tanko, D., Ezealor, A. U. and Bako, S. P. (2013). Current status of the woody vegetation of Dumbi inselbergs and its surroundings, Zaria, Northern Guinea Savanna Nigeria. *Nigeria Journal of Scientific Research*, 13:1-9.
15. Kayode, J. (2006). Conservation in Nigeria Perspective. Akolawole Publishers, Ado-Ekiti, 52pp.
16. Tanko, D. (2012). Some aspect of ecology of the Dumbi inselbergs and their environs in Zaria, Northern Nigeria. Unpublished PhD Dissertation. Department of Biological Sciences, Ahmadu Bello University, Zaria, Nigeria. 172p.
17. Dell R, S. Holleran, R. Ramakrishnan (2002): Sample size determination. *ILAR J* 43:207-213.
18. Michel Arbonnier. Trees, shrubs, and lianas of West African dry zones; 2004.
19. Medina Lemos, R., and R.M. Fonseca. 2009. Anacardiaceae. Flora del Valle de Tehuacán Cuicatlán. Fasc. 71. 60 pp.
20. Stephen F. S, Seline Omondi (2017), Checklist of plants in the University Botanic Garden of Maseno and their significances to the society. *Journal of Pharmacy and Biological* . Volume 12, Issue 1 Ver. II , PP 27-49 ISSN:2278-3008, p-ISSN:2319-7676 DOI: 10.9790/3008-1201022749 www.iosrjournals.org
21. Joly, A.B. (1991). Botany: An Introduction to Plant Taxonomy. 10th ed., São Paulo: National Publishing Company, p. 462.

22. Wardle, D.A., Walker, L.R. and Bardgett, R.D. (2004). Ecosystem properties and forest decline in contrasting long-term chronosequence. *Science* 305: 509 – 513
23. Buba, T. (2015). Impact of different types of land use on pattern of herbaceous plant community in the Nigerian Northern Guinea Savanna. *Journal of Agriculture and Ecology Research International*, 4, 151–165.
<https://doi.org/10.9734/JAERI/2015/16680>
24. Osawaru, M.E., Ogwu, M.C., Chime, A.O. and Ebosa, A. B. (2014). Weed flora of University of Benin in terms of diversity and richness using two ecological models. *Scientia Africana* 13(2): 102 – 120.
25. Tanko, D., Fidel- Tiseer, J. and Tiseer, F. A. (2010). A checklist of current savanna tree vegetation in a relatively undisturbed location in Zaria, Nigeria. *Biological and Environment Sciences Journal for the Tropics*, 7(2):11

UNDER PEER REVIEW