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# Floristic Composition Of Vascular Angiosperms In Faculty Of Life Sciences, Ambrose Alli University, Ekpoma, Edo State, Nigeria

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## Abstract
A survey of the floristic composition of the Faculty of Life Sciences site, Ambrose Alli University, Ekpoma, Edo State was carried out. A total of 96 species belonging to 32 families were identified and found to be present within the area of study. The family Poaceae had the highest number of species (17), followed by Asteraceae with 11 species and Cyperaceae with nine species. Ten families had two to 8 species while in relation to habit, herbs were the most abundant followed by shrubs, the least were the trees. From this study, it is obvious that the Faculty of Life Sciences site is rich in plant biodiversity of socio-economic values. Proper care and management of these plants especially the exotic ones are advised. The management of the Faculty should put in place modalities to ensure the preservation and protection of these plants so they do not go into extinction or be lost due to future developmental projects or activities.

Keywords: Floristic composition, survey, vascular angiosperms, Poaceae, Asteraceae, Cyperaceae

## Introduction
Biodiversity is the degree of variation of life forms within a given ecosystem, biome, or on an entire planet. Biodiversity is not consistent across the earth (Philomena *et al.*, 2011). Most species that have existed on earth are now extinct (WGBH Educational Foundation, 2001). Many species are becoming extinct even before their discovery. This scenario necessitates the urgent need of the conservation of this diversity (Wagay *et al.,* 2015). Unarguably, one of the persistent problems associated with deforestation is the selective exploitation of some targeted species for economic, social and spiritual paraphernalia, and trees are mostly targeted (Alamu and Agbeja, 2011). Diversity among individual plant species and ecosystem provides raw materials that enable human communities to adapt to changes now and in the future. Deprived of biodiversity, the ability of humankind to meet the challenges resulting, for example, from global warming and ozone depletion would be severely limited (Idu *et al.*, 2009). Loss of biodiversity is frequently presented as an environmental problem, but the underlying causes are essentially social, economic and political. Unfortunately, information on the status of biodiversity conservation in Nigeria is currently lacking. Although no reliable record yet exists for assessing the rate of biodiversity loss in Nigeria, substantial evidence shows that biodiversity is being lost at a disturbing rate. The IUCN Red List assessment reports that 141 native animals and 168 native plant species in Nigeria are currently classified into different threat categories (Imarhiagbe *et al.*, 2020).
The aim of this study is to document the floristic found around the Faculty of Life Sciences, Ambrose Alli University, Ekpoma, Edo State. It will also attempt to provide, create and prepare an updated checklist of the identified plant species to serve as a baseline dataset for future comparison of adequate conservation measures which should be carried out for posterity.

## Materials and Methods
### Study Area
The study was carried out at the Faculty of Life Sciences, Ambrose Alli University, Ekpoma, Edo State, Nigeria. The study location lies between 6°44'56.904''N and 6°4'23.574''E at an elevation of 358.485. Ekpoma has a tropical climate characterized by two distinct seasons: April to October represents the wet season with a brief dry spell in August while November to March is dry. The annual rainfall in the area exceeds 2000 mm with a bimodal distribution. The first peak occurs in July with a mean monthly precipitation of 344.7 mm while the second is in September with a mean of 457.2 mm. The highest mean monthly temperature of 29.1°C is recorded in March and the lowest of 24.4°C in June. The topography is undulating while the vegetation of the area is tropical rainforest.

### Collection and Identification of Plant Specimens
Different plant species found around the Faculty were collected from the front, sides and back of the buildings in the months of June and August 2021. In terms of the floristic composition, data were treated using descriptive analysis. All species encountered within every category were listed according to their family names and scientific names. Floristic species encountered were also categorized according to their habit, whether it was a tree, a shrub or a herb. The herbaceous species comprised grasses, sedges and vines
Identification of the specimens was done with the aid of descriptive and illustrated texts such as the Flora of Nigeria Grasses (Lowe, 1989); A Handbook of West African Weeds (Akobundu and Agyakwa, 1998); Outlines and Pictures of Medicinal Plants from Nigeria (Odugbemi, 2006). Samples of unknown plants were collected and taken to the herbarium of the Department of Plant Science and Biotechnology, Ambrose Alli University for identification.

## Results
The plant species identified during the study are shown in Table 1 while Table 2 shows the species distribution according to families. Plate 1 A-D shows the pictorial representation of the species found around the Faculty while Figures 1, 2 and 3 show the distribution of plant species in relation to their major plant group, percentage distribution in relation to their habit and the pattern of ornamental distribution, respectively.
A total of 96 plant species belonging to 32 plant families were encountered and recorded (Table 1). Among the dominant families, Poaceae and Asteraceae had the highest species diversity in terms of richness with seventeen and eleven species, respectively. Other families recorded include Cyperaceae (9 species), Euphorbiaceae (8 species), Amaranthaceae (7) and Malvaceae (5) species.

Table 1: Checklist of identified species at the Faculty of Life Sciences, Ambrose Alli University, Ekpoma

| S/No | Botanical name | Family | Habit |
|---|---|---|---|
| 1. | *Alcalypha wilkesiena* Muell. Arg. | Euphorbiaceae | Shrub |
| 2. | *Acanthus montanus* (Nees) T. Anders. | Acanthaceae | Herb |
| 3. | *Acroceras zizanioides* Dandy. | Poaceae | Grass |
| 4. | *Ageratum conyzoides* Linn. | Asteraceae | Herb |
| 5. | *Alchornea laxiflora* (Benthe) Pax. and K. Hoffm. | Euphorbiaceae | Shrub |
| 6. | *Alchornea cordifolia* (Schum & Thonn. Muell. Arg. | Euphorbiaceae | Shrub |
| 7. | *Alternanthera brasiliana* (L.) Kuntze | Amaranthaceae | Shrub |
| 8. | *Alternanthera pungens* H. B & K. | Amaranthaceae | Herb |
| 9. | *Alternathera sessilis.* (Linn.) DC | Amaranthaceae | Herb |
| 10. | *Amaranthus spinosus* Linn. | Amaranthaceae | Herb |
| 11. | *Andropogon gayanus* Kunth. | Poaceae | Grass |
| 12. | *Aphelandra squarrosa* Nees. | Acanthaceae | Shrub |
| 13. | *Aspilia africana* (Pers.) C.D. Adams | Asteraceae | Herb |
| 14. | *Asystasia gangetica* (L.) T. Anders | Acanthaceae | Herb |
| 15. | *Axonopus compressus* (Sw.) P.Beauv. | Poaceae | Grass |
| 16. | *Bidens pilosa* Linn. | Asteraceae | Herb |
| 17. | *Boerhavia diffusa* Linn. | Nyctaginaceae | Herb |
| 18. | *Breynia discticha* J.R.Forst. & G.Forst. | Phyllanthaceae | Shrub |
| 19. | *Calopogonium mucunoides* Desv. | Fabaceae | Herb |
| 20. | *Chamaecrista mimosoides* (Linn.) Greene | Fabaceae | Shrub |
| 21. | *Chloris pilosa* Schumach. | Poaceae | Grass |
| 22. | *Chromolaena odorata* (L.) R. M. King & Robinson | Asteraceae | Shrub |
| 23. | *Cleome rutidospermai* DC. | Cleomaceae | Herb |
| 24. | *Commelina benghalensis* Linn. | Commelinaceae | Herb |
| 25. | *Codiaeum variegatum* Linn. | Euphorbiaceae | Shrub |
| 26. | *Conyza sumatrensis* (Retz.) Walker | Asteraceae | Herb |
| 27. | *Croton hirtus* Linn. | Euphorbiaceae | Herb |
| 28. | *Crotalaria retusa* Linn. | Fabaceae | Herb |
| 29. | *Cyathula prostrata* (L) Blume. | Amaranthaceae | Herb |
| 30. | *Cynodon dactylon* (Linn.) Pers. | Poaceae | Grass |
| 31. | *Cyperus difformis* Linn. | Cyperaceae | Sedge |
| 32. | *Cyperus haspan* Linn. | Cyperaceae | Sedge |
| 33. | *Cyperus iria* Linn. | Cyperaceae | Sedge |
| 34. | *Dactyloctenium aegyptium* (Linn.) P. Beauv. | Poaceae | Grass |
| 35. | *Digitaria horizontalis* Willd | Poaceae | Grass |
| 36. | *Diodia sarmentosa* Sw. | Rubiaceae | Herb |
| 37. | *Duranta erecta* Linn. | Verbenaceae | Shrub |
| 38. | *Eleusine indica* (Linn.) Gaertn. | Poaceae | Grass |
| 39. | *Emilia coccinea* (Sims) G. Don | Asteraceae | Herb |
| 40. | *Eragrostis tenella* (Linn.) P. Beauv. ex. Roem & Schult. | Poaceae | Grass |
| 41. | *Euonymus fortune* (Turcz.) | Celastraceae | Shrub |
| 42. | *Euphorbia heterophylla* Linn. | Euphorbiaceae | Herb |
| 43. | *Euphorbia hirta* Linn. | Euphorbiaceae | Herb |
| 44. | *Fimbristylis ferruginea* (Linn.) Vahl | Cyperaceae | Sedge |
| 45. | *Gmelina arborea* Roxb. | Verbenaceae. | Tree |
| 46. | *Gomphrena celosioides* Mart. | Amaranthaceae | Herb |
| 47. | *Greenwayodendron suaveolens* (Engl. & Diels) Verdc. | Annonaceae | Tree |
| 48. | *Heliotropium indicum* L. | Boraginaceae | Herb |
| 49. | *Heterotis rotundifolia* (Sm.) Jac.-Fél | Melastomataceae | Herb |
| 50. | *Ipomoea triloba* Linn. | Convolvulaceae | Twiner |
| 51. | *Iresine diffusa* Humb. & Bonpl. Ex Willd. | Amaranthaceae | Shrub |
| 52. | *Ischaemum rugosum* Salisb. | Poaceae | Grass |
| 53. | *Kyllinga bulbosa* Beauv. | Cyperaceae | Sedge |
| 54. | *Kyllinga pumila* Michx. | Cyperaceae | Sedge |
| 55. | *Kyllinga erecta* Schumach var. *erecta* | Cyperaceae | Sedge |
| 56. | *Launaea taraxacifolia* (Willd.) Amin. MS ex C. Jeffrey. | Asteraceae | Herb |
| 57. | *Laportea aestuans* (L.) Chew | Urticaceae | Herb |

| S/No | Botanical name | Family | Habit |
|---|---|---|---|
| 58. | *Ludwigia decurrens* Walt. | Onagraceae | Herb |
| 59. | *Melastomastrum capitatum* (Vahl) A. & R. Fern | Melastomacaceae | Shrub |
| 60. | *Mariscus alternifolius* Vahl. | Cyperaceae | Sedge |
| 61. | *Mimosa pudica* Linn. | Fabaceae | Herb |
| 62. | *Mitracarpus villosus* (Sw.) DC | Rubiaceae | Herb |
| 63. | *Momordica charantia* Linn. | Cucurbitaceae | Herb |
| 64. | *Oldenlandia corymbosa* Linn | Rubiaceae | Herb |
| 65. | *Olax Spp.* | Olacaceae | Shrub |
| 66. | *Oplismenus burmannii* (Retz) P. Beauv. | Poaceae | Grass |
| 67. | *Panicum laxum* Sw. | Poaceae | Grass |
| 68. | *Paspalum scrobiculatum* Linn. | Poaceae | Grass |
| 69. | *Peperomia pellucida* (L.) H.B. & K. | Piperaceae | Herb |
| 70. | *Perotis indica* (Linn.) O. Ktze | Poaceae | Grass |
| 71. | *Phyllanthus amarus* Schum. & Thonn. | Euphorbiaceae | Herb |
| 72. | *Physalis angulata* Linn. | Solanaceae | Herb |
| 73. | *Platostoma africanum* P.Beauv. | Lamiaceae | Herb |
| 74. | *Portulaca oleracea* Linn. | Portulacaceae | Herb |
| 75. | *Portulaca quadrifida* Linn. | Portulacaceae | Herb |
| 76. | *Pycreus lanceolatus* (Poir.) C.B. Cl. | Cyperaceae | Sedge |
| 77. | *Rhynchelytrum repens* (Wiild.) C. E Hubbard | Poaceae | Grass |
| 78. | *Sclerocarpus africanus.* Jacq ex Murr. | Asteraceae | Herb |
| 79. | *Scoparia dulcis* Linn. | Scophulariaceae | Herb |
| 80. | *Setaria barbata* (Lam.) Kunth. | Poaceae | Grass |
| 81. | *Sida acuta* Burm. f. | Malvaceae | Shrub |
| 82. | *Sida rhombifolia* L. | Malvaceae | Shrub |
| 83. | *Sida cordifolia* Linn. | Malvaceae | Shrub |
| 84. | *Sida garckeana* Polak. | Malvaceae | Shrub |
| 85. | *Smilax anceps* Willd. | Smilacaceae | Climber |
| 86. | *Solenostemon monostachys* (P.Beauv.) Brig. | Lamiaceae | Herb |
| 87. | *Spermacoce ocymoides* Burm. f. | Rubiaceae | Herb |
| 88. | *Syndrella nodiflora* Gaertn. | Asteraceae | Herb |
| 89. | *Talium triangulare* (Jacq.) Willd. | Portulacaceae | Herb |
| 90. | *Triantherma portulacastrum* Linn. | Ficoidaceae/ Aizoaceae | Herb |
| 91. | *Terminalia cattapa* L. | Combretaceae | Tree |
| 92. | *Tridax procumbens* Linn. | Asteraceae | Herb |
| 93. | *Triumphetta cordifolia* A. Rich. | Tiliaceae | Shrub |
| 94. | *Urena lobata* L. | Malvaceae | Shrub |
| 95. | *Vernonia cinerea* (Linn.) Less. | Asteraceae | Herb |
| 96. | *Zoysia* Spp. Willd. | Poaceae | Grass |

Table 2: Plant species distribution at the Faculty of Life Sciences, Ambrose Alli University, Ekpoma according to families

| S/No | Family | Number of species |
|---|---|---|
| 1. | Acanthaceae | 3 |
| 2. | Amaranthaceae | 7 |
| 3. | Annonaceae | 1 |
| 4. | Asteraceae | 11 |
| 5. | Boraginaceae | 1 |
| 6. | Celastraceae | 1 |
| 7. | Cleomaceae | 1 |
| 8. | Combretaceae | 1 |
| 9. | Commelinaceae | 1 |
| 10. | Convovulaceae | 1 |
| 11. | Cucurbitaceae | 1 |
| 12. | Cyperaceae | 9 |
| 13. | Euphorbiaceae | 8 |
| 14. | Fabaceae | 4 |

| S/No | Family | Number of species |
|---|---|---|
| 15. | Ficoidaceae | 1 |
| 16. | Lamiaceae | 2 |
| 17. | Malvaceae | 5 |
| 18. | Melastomacaceae | 2 |
| 19. | Nyctaginaceae | 1 |
| 20. | Olacaceae | 1 |
| 21. | Onagraceae | 1 |
| 22. | Phyllanthaceae | 1 |
| 23. | Piperaceae | 1 |
| 24. | Poaceae | 17 |
| 25. | Portulacaceae | 3 |
| 26. | Rubiaceae | 4 |
| 27. | Solanaceae | 1 |
| 28. | Smilacaceae | 1 |
| 29. | Scropulariaceae | 1 |
| 30. | Tiliaceae | 1 |
| 31. | Urticaceae | 1 |
| 32. | Verbanaceae | 2 |


Plate 1A-D. Pictorial presentation of the plant species occurring at the Faculty of Life Sciences, Ambrose Alli University, Ekpoma, Edo State. Plate 1A, Faculty surrounded with shrubs and grasses; Plate 1B, View of the various ornamental plants in the Faculty; Plate 1C, One of the ornamentals Aphelandra squarrosa; Plate 1D, Some tree species found in the Faculty

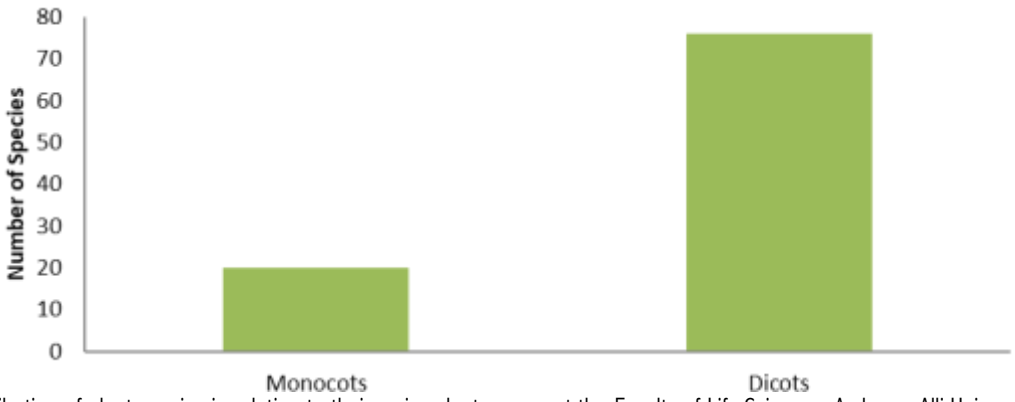


Figure 1. Distribution of plant species in relation to their major plant groups at the Faculty of Life Sciences, Ambrose Alli University, Ekpoma, Edo State

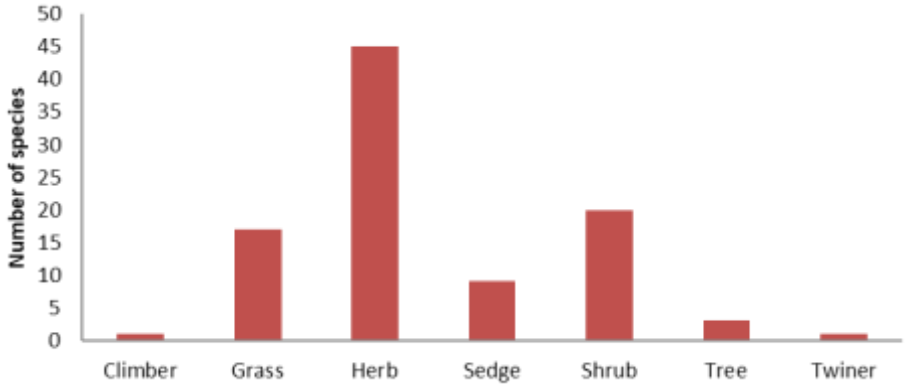


Figure 2. Percentage distribution of plants in relation to their habit at the Faculty of Life Sciences, Ambrose Alli University, Ekpoma, Edo State.

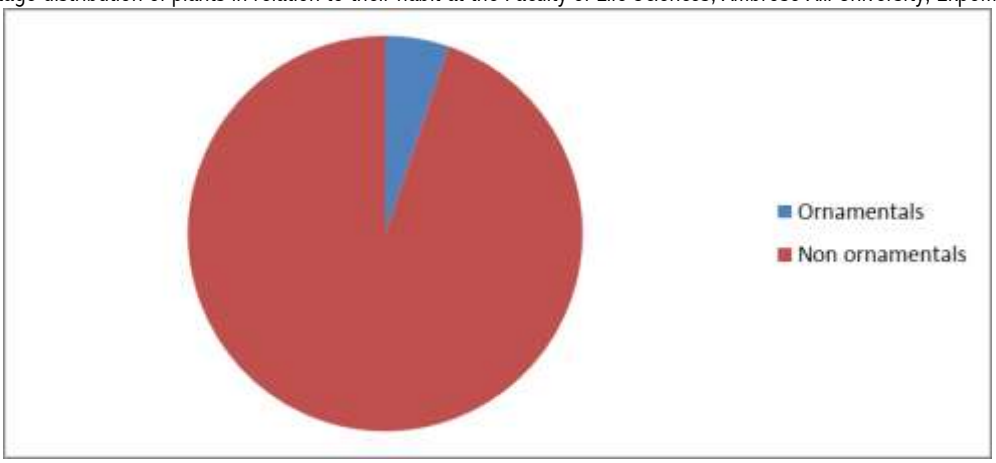


Fig. 3. Pie chart of ornamental plants distribution observed during the survey

## Discussion

Various studies on the flora composition of Edo State have been undertaken but very few have dealt with plant species on university campuses. The known records of species compositions with regards to universities in Edo State are those of Otaru (1993) which reported the occurrence of 122 weeds in Ujemen Campus of Ambrose Alli University (AAU), Ekpoma, Edo State, Nigeria; Ogie-Odia *et al.* (2010) carried out a study on the weed flora diversity of Emaudo Campus of the University, and Omolola (2018) produced a preliminary checklist of the flora of Faculty of Life Sciences. The present study in the same Faculty environment has recorded 96 species, which is greater than the findings of Omolola (2018), who recorded only 34 species, showing that the plant species diversity of the plants at this location is greater than previously known. Omolola (2018) recorded Asteraceae as the family with the highest number of plant species, followed by Euphorbiaceae, Fabaceae and Poaceae which is at variance with the current study in which we found Poaceae as the family with the highest species. The herbs were the dominant species and may indicate their ability to grow fast and spread more rapidly. It may also include their ability to adapt to a wide range of environmental conditions and tolerance to drought, full sun to partial shade. Shrubs and grasses were the next set of plants with high species composition. Grasses inhabit the earth in greater abundance than any other comparable group of plants (Ogie-Odia *et al.*, 2010). Grasses tend to survive more than herbs in tough environments due to their adaptability in terms of their tough structural composition. However, in this study, the herb composition was much higher. The possible reason for this may be that

the prevailing ecological factors like soil and climate favoured the spread of herbs more than grasses. This could also be a result of their ecological flexibility, resilience to disturbance, long-distance seed dispersal and capacity to grow in environments with limited soil moisture. Some ecological problems in the area are grazing, browsing, and trampling by domestic animals, especially cattle. These elements caused the grass species not to reach their climax. Grazing is one of the depressing aspects, which has caused a reduction in vegetation (Khan and Hussain, 2012). During grazing, the palatable species are selected and this gives room for the non-palatable species to increase. This is noticeable in many places, manifesting in stunted growth and not reaching the flowering stage of the plants. Also, students frequently trample on grasses thereby killing them and reducing the population. All these could lead to their extinction. The distribution of grasses is also governed by the chemical and physical nature of the soil in the geographical region (Farooq *et al.*, 2009).

The results from this study revealed that the occurrence of tree species in the study area is extremely low as shown by their poor composition. The identified trees were planted around the car parks. This observation tends to buttress the previous observations of Oladehinde (2016) and Salbitano *et al.,* (2016) that administrators often fail to sufficiently take urban forests as serious issues. EarthTalk (2016) listed the advantages of planting trees by roadsides including enhancement of the liveability of urban streets and control of noise pollution. Trees also reduce the chance of flood and soil erosion; provide relief to humans, birds and animals from the sun and rain. Wolf (2006) asserted that roadside soils and vegetation capture a reasonable proportion of transportation carbon emissions thus constituting valuable "banks" for meeting ambitious carbon sequestration goals. Trees on campus must be properly labelled with summaries of their values. This will confer respect on the trees from members of the University community (Ajayi *et al.*, 2020).

This study revealed some exotic ornamental species such as *Aphelandra squarrosa, Breynia discticha* and *Duranta erecta* 'Gold dewdrop' amongst others planted in the faculty to beautify the surrounding. Many of the species that are already endangered are faced with the risk of eventual extinction if human activities such as land development, logging and pollution are not checked. While developmental activities continue on the campus continues, it will be a sound scientific judgment to protect a representative sample of vegetation for posterity. The effectiveness and success of protection in any part of the world normally depend on many local factors of economic, social and political nature (Jianguo *et al.* 2003). However, the composition of annual herbaceous flora may vary in different seasons. Therefore, these species can be utilized keeping in view the idea of sustainable development and utilization (Surender *et al.,* 2016).

Biodiversity provides valuable bio-resources that support the existence of man on earth (Aguilera 2019). As man continues to depend on the rich flora diversity, it is also important to consider the sustainable use and conservation status of these important plant species. With the continuous degradation of the ecosystem owing to structural and economic development in our world today, there is also the threat of species extinction. Nevertheless, these can be prevented if conservation practices such as forest policies and research programmes are encouraged by governmental and non-governmental agencies, both at national and international levels. Such conservation strategies will ensure that our forests are protected and these species are prevented from going into extinction (Soladoye *et al.*, 2013)

The need to study and update the flora composition in our environment and take necessary measures to maintain the ecological balance of the given area is very important in order to sustain the biodiversity of the environment. Such measures should begin from our immediate environment and, hence, from our campus flora. A healthy ecosystem is built when it is maintained in a sustainable manner. By showing how this very relatively small rehabilitated area, usually disturbed by students and grazing animals is serving as a safe haven for a considerable number of animal and plant species, it is possible to show the necessity of delimiting land for the purpose of plant and animal conservation.

Most of the plant species growing in the vicinity of the Faculty of Life Sciences, AAU serve different purposes, which include windbreaks by the tree species and beautification by the ornamental species. Others serve as food for animals such as cattle which graze around there frequently. They protect the ecosystem from degradation and also are edible to animals, and they, thereby, serve as a support system for the ecosystem.

An increase in population will lead to the enrolment of more students into AAU; this creates the need for more infrastructural development, in terms of providing more classrooms and administrative blocks. The consequence is the continuous degradation of the surrounding vegetation. Of particular interest is the fate of the plant species around the Faculty of Life Sciences, if this trend continues unabated. Therefore, it is recommended that while the development of infrastructure around the Faculty of Life Sciences environment continues, the plant species in this locality should receive appropriate care and consideration.

## Conclusion

Assessment of biological diversity has continued to be of interest to scientists around the world. Nigeria's numerous flora and fauna species are faced with challenges of species conservation, which is gradually leading to the total disappearance of these human sustainers, owing to anthropogenic activities. There is therefore the need to properly implement our conservation and sustainable management strategies. A close monitoring of the study area is suggested to avoid indiscriminate habitat destruction by those that daily use the faculty facilities and also by visitors to the university community. In this regard, the University and Faculty management have a great role to play in order to achieve this goal.

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