

Floristic Survey of Ornamental Plants in the University of Delta Main Campus, Agbor, Nigeria

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ABSTRACT

Background: This study assessed the diversity and distribution of ornamental plants within the University of Delta Main Campus, Agbor, Nigeria. This would provide a foundational checklist of the vegetation, life forms, and spatial distribution within the study area.

Methods A descriptive survey design involving direct field observation was employed to identify and document ornamental plant species across 17 locations within the campus. Plant identification was conducted using standard taxonomic guides and digital plant identification tools.

Results: A total of 17 ornamental plant species belonging to 14 botanical families were recorded. The dominant families were Euphorbiaceae and Arecaceae. *Juniperus chinensis* was the most abundant species, while *Dyopsis lutescens* was the least represented. Diversity indices showed considerable variation among sites, with the Sports Unit exhibiting the highest Shannon diversity index ($H' = 1.427$) and Fisher's alpha (4.632), indicating relatively high species richness and evenness. Conversely, the 1000-Capacity Hall, Faculty of Performing Arts, and Management Block exhibited the lowest diversity values.

Conclusion: The findings highlight the importance of ornamental plants in enhancing campus aesthetics, biodiversity conservation, and environmental sustainability. The study recommends increased planting of diverse native ornamental species and regular landscape assessment to improve ecological resilience within the university environment.

Keywords: Biodiversity, Campus landscape, Diversity indices, Floristic survey, Ornamental plants

1.0 INTRODUCTION

Plants form the foundation of life on Earth and serve as primary producers within ecosystems, providing food, oxygen, and energy for other living organisms. Among the numerous categories of plants, ornamental plants are cultivated primarily for their aesthetic appeal and decorative value. These plants are grown to beautify landscapes, gardens, parks, homes, and institutional environments. Beyond their decorative functions, ornamental plants contribute significantly to landscaping, environmental research, biodiversity conservation, and employment generation [1]. Ornamental plants provide numerous environmental benefits, including air purification, temperature moderation, noise reduction, carbon sequestration, and the provision of habitats for birds, insects, and other organisms [2]. These groups of plants are cultivated for attractive characteristics such as colourful flowers, unique foliage, pleasant fragrance, fruit, and overall plant form. They enhance the visual appeal of residential, commercial, educational, and religious environments. The surroundings of banks, schools, industries, shopping complexes, and places of worship are often beautified with a variety of ornamental trees, shrubs, flowers, and ferns. Consequently, the demand for ornamental

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plants has increased considerably in recent years due to their aesthetic, environmental, and economic importance [3]. Nigeria is predominantly an agrarian nation, with a substantial proportion of its population engaged in agricultural activities [4]. The cultivation and utilization of ornamental plants possess enormous potential for income generation, employment creation, and environmental sustainability. Across the country, many individuals engage in ornamental horticulture as a source of livelihood. In Delta State and other parts of southern Nigeria, ornamental plant nurseries are commonly found along major roads, displaying a wide range of plant species for commercial purposes. The economic contributions of these enterprises are significant, as they provide income for growers and contribute to local and national economic development. Apart from their economic value, ornamental plants have important cultural, medicinal, and social significance. Osawaru & Ogwu [5] noted that plants play vital roles in cultural traditions, religious practices, and social activities in many societies. Several ornamental plant species also possess medicinal properties and have long been used in traditional healthcare systems. Furthermore, ornamental plants provide therapeutic benefits by creating aesthetically pleasing environments that promote relaxation, reduce stress, and improve mental well-being. The importance of ornamental horticulture also extends to recreation and sports. Ornamental grasses and turf species are commonly used in sports fields, parks, and recreational gardens, creating spaces where people can relax, socialize, and engage in physical activities. In addition, ornamental plants help regulate environmental conditions through evapotranspiration, thereby moderating temperatures, improving air quality, and reducing the adverse effects of urban heat [6]. Certain ornamental flowers are also associated with cultural and seasonal celebrations. For example, roses are commonly associated with Valentine's Day celebrations, while poinsettias are widely used during Christmas festivities [7]. Within university campuses, ornamental plants play an important role in enhancing environmental quality and aesthetic appeal. They contribute to beautification while simultaneously providing ecological services such as air purification, microclimate regulation, erosion control, and habitat provision for beneficial organisms. However, there is currently no comprehensive inventory documenting their diversity, abundance, and spatial distribution. This lack of baseline information presents challenges for effective landscape planning, maintenance, conservation, and sustainable environmental management within the university. Despite their importance, the absence of systematic documentation and proper identification of these plant species limits the university's ability to effectively utilize and manage these resources. Furthermore, inadequate knowledge of the existing ornamental plant diversity may hinder efforts aimed at campus beautification, biodiversity conservation, and ecological sustainability. The lack of documented information also restricts opportunities for academic research, practical teaching, and environmental studies involving ornamental plant resources. Reliable data on ornamental plant species composition and distribution are essential for informed decision-making and the development of effective landscaping and conservation strategies [8]. Therefore, this study was undertaken to survey and document the ornamental plants present on campus, providing baseline information that can support future landscaping, conservation, and environmental management initiatives.

2.0 MATERIALS AND METHODS

2.1 Materials

2.1.1 Biological materials

Biological materials related to this research were: *Juniperus chinensis*, *Tecoma stans*, *Araucaria columnaris*, *Croton zambesicus*, *Cycas revoluta*, *Roystonea oleracea*, and *Ricinus communis*. Other species observed were *Dracaena fragrans*, *Euphorbia milii*, *Duranta erecta*, and turf grasses such as *Axonopus compressus*.

2.1.2 Chemicals and reagents

Chemicals and reagents were not applicable.

2.1.3 Equipment

Equipment used for this study include GPS device, Camera, PlantNet, LeafSnap, Measuring tape and Field notebook.

2.2 Methods

2.2.1 Study Area

The study was conducted at the main campus of the University of Delta, Agbor, Delta State, Nigeria. Agbor is located within the rainforest ecological zone of southern Nigeria around latitude 6°15'N and longitude 6°10'E. The area



experiences a tropical climate characterized by distinct wet and dry seasons. Annual rainfall ranges between 1,500 and 2,500 mm, while average temperatures range from 24°C to 33°C.



Fig. 1: Pictorial view of the study area

2.2.2 Survey Design and Sampling

A descriptive survey approach was employed. Ornamental plants were surveyed across seventeen designated locations within the campus, including administrative buildings, academic faculties, recreational areas, walkways, and open spaces.

A purposive sampling technique was used to identify ornamental plant species cultivated for aesthetic and landscaping purposes. Plants encountered during field observations were recorded, photographed, and documented [9].

2.2.3 Plant Identification

Each plant specimen was carefully assessed based on its morphological characteristics, including leaf morphology, flower structure, bark texture, growth habit, and overall appearance, to facilitate accurate identification. Photographs were taken in situ to capture the natural growth patterns and landscape arrangement of the plants. Plant identification was carried out using standard botanical references, including field guides, floras, and taxonomic textbooks, supplemented with mobile plant identification applications such as PlantNet and LeafSnap. Where uncertainties arose, expert consultations were sought from botanists and horticulturists to verify species identity. Subsequently, the identified ornamental plants were classified into their respective families and species following established taxonomic principles and nomenclature standards [10].

2.2.4 Data Analysis

Species abundance and distribution were summarized using descriptive statistics. Diversity indices including Shannon-Wiener index (H'), Simpson index, Evenness, Margalef index, Menhinick index, Berger-Parker dominance, and Fisher's alpha were computed using Paleontological Statistics (PAST) version 4.0 software.

2.3 Statistical Analysis

Data are presented as qualitative and quantitative variables using descriptive statistical approach.

3.0 RESULTS

3.1 Checklist and distribution of Ornamental Plants in University of Delta, Agbor

Table 1 presents the results of a floristic survey conducted across seventeen (17) different locations within the University of Delta, Agbor. The survey recorded a total of seventeen ornamental plant species distributed among various botanical families. The families most frequently represented were Euphorbiaceae, Arecaceae, and



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Amaranthaceae. Prominent ornamental species identified during the study included *Juniperus chinensis*, *Tecoma stans*, *Araucaria columnaris*, *Croton zambesicus*, *Cycas revoluta*, *Roystonea oleracea*, and *Ricinus communis*. Other species observed were *Dracaena fragrans*, *Euphorbia milii*, *Duranta erecta*, and turf grasses such as *Axonopus compressus*. Table 2 illustrates the quantitative distribution of the ornamental plant species across the study sites. *Juniperus chinensis* was the most widely distributed species, occurring in seven locations, with its highest abundance of twenty (20) individuals recorded at the Faculty of Nursing. *Araucaria columnaris* and *Tecoma stans* were also relatively abundant, with fourteen (14) and twelve (12) individuals recorded at the Sports Unit and Walkway, respectively. Conversely, species such as *Roystonea oleracea*, *Croton zambesicus*, and *Cycas revoluta* exhibited restricted distribution patterns, occurring in only one or two locations and with relatively low frequencies.

Table 1: Checklist of Ornamental Plants in University of Delta, Agbor

	Speceis	Author Citation	Family	Common Name
1	<i>Juniperus chinensis</i>	L.	Cupressaceae	Chinese juniper
2	<i>Tecoma stans</i>	(L.) Juss.ex Kunth	Bignoniaceae	Yellow Trumpet Bush
3	<i>Araucaria columnaris</i>	Huxley. A.	Araucariaceae	Cook's Pine
4	<i>Croton zambesicus</i>	Muller . Arg.	Euphorbiaceae	Croton
5	<i>Cycas revolute</i>	Thunb	Cycadaceae	Sago palm
6	<i>Roystonea oleracea</i>	(Jacq.) O. F. Cook	Arecaceae	Caribbean Royal palm
7	<i>Ricinus communis</i>	L.	Euphorbiaceae	Castor oil plant
8	<i>Dyopsis lutescens</i>	Linn.	Arecaceae	<i>Areca palm</i>
9	<i>Polyalthia longifolia</i>	(Sonn.) Thwaites	Annonaceae	Asia small tree
10	<i>Euphorbia milii</i>	Des Moulins	Euphorbiaceae	Crown of thorns
11	<i>Dracaena fragrans</i>	(L.) Ker Gawl	Draceanaceae	Corn plant
12	<i>Tradescantia spathacea</i>	Sw.	Commelinaceae	Purple oyster plant
13	<i>Terminalia mantaly</i>	H. Perrier	Combretaceae	Satellite tree
14	<i>Agapanthus africanus</i>	(L.) Hoffmanns	Amaryllidaceae	Lily of the Nile
15	<i>Axonopus compressus</i>	(Sw.) P. Beauv.	Poaceae	Carpet grass
16	<i>Ixora coccinea</i>	L.	Rubiaceae	Ixora
17	<i>Duranta erecta</i>	L.	Verbenaceae	Golden dew drop

Table 2: Distribution of Ornamental Plants in University of Delta, Agbor

		Site 1	Site 2	Site 3	Site 4	Site 5	Site 6	Site 7	Site 8	Site 9	Site 10	Site 11	Site 12	Site 13	Site 14	Site 15	Site 16	Site 17
1	<i>J. chinensis</i>	3	-	4	-	-	-	16	3	20	-	-	3	-	-	-	-	-
2	<i>T. stans</i>	-	-	2	12	-	-	-	-	-	-	-	-	-	-	-	-	-
3	<i>A. columnaris</i>	2	-	-	14	-	-	-	-	-	-	-	-	-	-	-	-	-
4	<i>C. zambesicus</i>	-	-	-	-	1	-	-	1	-	-	-	-	-	-	-	-	-
5	<i>C. revolute</i>	-	-	-	-	-	-	-	-	1	-	-	-	1	-	-	-	-
6	<i>R. oleracea</i>	-	-	-	-	-	-	-	-	-	-	-	-	-	2	-	-	-
7	<i>R. communis</i>	-	-	-	-	-	-	-	-	30	-	-	-	-	-	-	-	-
8	<i>D. lutescens</i>	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-
9	<i>P. longifolia</i>	-	-	-	-	-	-	-	1	-	-	1	-	-	3	16	-	-
10	<i>E. mili</i>	-	-	-	-	-	-	-	-	-	-	-	-	-	-	7	-	-
11	<i>D. fragrans</i>	-	-	-	-	-	-	-	-	-	-	-	-	-	-	6	-	-
12	<i>T. spathacea</i>	-	-	-	-	-	-	-	-	-	-	-	-	-	-	10	-	-
13	<i>T. mantaly</i>	-	-	-	-	5	-	-	11	10	10	26	4	-	-	-	4	-
15	<i>A. africanus</i>	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	6

Key: Site 1: Bursary; Site 2: Round about; Site 3: Sports Unit; Site 4: Walkway; Site 5: Library; Site 6: Zenith Bank; Site 7: Admin Block; Site 8: Fac. of LIS; Site 9: Nursing Dept.; Site 10: Fac. of Comp.; Site 11: Fac. of Agric.; Site 12: Fac of Arts; Site 13: 1000 capacity hall; Site 14: Student advisory; Site 15: Outside School Compound; Site 16: Fac of Per. Arts; Site 17: Mgt. Block.

Table 3: Distribution of Ornamental Herbs and Grasses in University of Delta, Agbor

		Site 1	Site 2	Site 3	Site 4	Site 5	Site 6	Site 7	Site 8	Site 9	Site 10	Site 11	Site 12	Site 13	Site 14	Site 15	Site 16	Site 17
1	<i>I. coccinea</i>	Present	Present	present	present	-	-	present	-	-	-	present	-	-	-	-	-	-
2	<i>D. lutescens</i>	Present	Present	present	present	Present	present	-	-	-	-	present	-	-	-	-	-	-
5	<i>A. compressus</i>	-	-	present	present	Present	-	-	present	-	present	present	present	-	-	present	-	-

Key: Site 1: Bursary; Site 2: Round about; Site 3: Sports Unit; Site 4: Walkway; Site 5: Library; Site 6: Zenith Bank; Site 7: Admin Block; Site 8: Fac. of LIS; Site 9: Nursing Dept.; Site 10: Fac. of Comp.; Site 11: Fac. of Agric.; Site 12: Fac of Arts; Site 13: 1000 capacity hall; Site 14: Student advisory; Site 15: Outside School Compound; Site 16: Fac. of Per. Arts; Site 17: Mgt. Block.



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Table 4: Diversity Indices of Ornamental species in University of Delta, Agbor

	Site 1	Site 2	Site 3	Site 4	Site 5	Site 6	Site 7	Site 8	Site 9	Site 10	Site 11	Site 12	Site 13	Site 14	Site 15	Site 16	Site 17
Taxa_S	4	3	5	5	4	2	2	5	3	3	5	3	1	3	4	1	1
Dominance	0.3061	0.333	0.284	0.407	0.437	0.5	0.889	0.460	0.388	0.708	0.755	0.406	1	0.388	0.289	1	1
Simpson	0.6939	0.667	0.716	0.592	0.562	0.5	0.110	0.539	0.611	0.291	0.244	0.593	0	0.611	0.710	0	0
Shannon	1.277	1.099	1.427	1.065	1.074	0.693	0.223	1.088	1.011	0.566	0.577	0.974	0	1.011	1.311	0	0
Evenness	0.8965	1	0.833	0.580	0.731	1	0.625	0.593	0.916	0.587	0.356	0.883	1	0.916	0.927	1	1
Brillouin	0.8629	0.597	0.992	0.899	0.727	0.346	0.166	0.835	0.942	0.406	0.446	0.704	0	0.682	1.173	0	0
Menhinick	1.512	1.732	1.667	0.928	1.414	1.414	0.485	1.213	0.387	0.866	0.912	1.061	1	1.225	0.640	0.5	0.408
Margalef	1.542	1.82	1.82	1.188	1.443	1.443	0.353	1.412	0.488	0.804	1.176	0.961	0	1.116	0.818	0	0
Equitability	0.9212	1	0.886	0.661	0.774	1	0.322	0.675	0.920	0.515	0.358	0.886		0.920	0.945		
Fisher alpha	3.878	0	4.632	1.742	3.184	0	0.588	2.387	0.664	1.284	1.713	1.743	0	2.388	1.117	0.42	0.343
Berger-Parker	0.4286	0.333	0.444	0.482	0.625	0.5	0.941	0.647	0.5	0.833	0.866	0.5	1	0.5	0.410	1	1

Key: Site 1: Bursary; Site 2: Round about; Site 3: Sports Unit; Site 4: Walkway; Site 5: Library; Site 6: Zenith Bank; Site 7: Admin Block; Site 8: Fac. of LIS; Site 9: Nursing Dept.; Site 10: Fac. of Comp.; Site 11: Fac. of Agric.; Site 12: Fac of Arts; Site 13: 1000 capacity hall; Site 14: Student advisory; Site 15: Outside School Compound; Site 16: Fac of Per. Arts; Site 17: Mgt. Block.



3.2 Distribution of Ornamental Herbs and Grasses in University of Delta, Agbor

Table 3 presents the distribution pattern of ornamental herbs and grasses across the surveyed locations. Among the species recorded, *Ixora coccinea*, *Dyopsis lutescens*, and *Axonopus compressus* exhibited relatively wide distributions. *Ixora coccinea* was observed in six different sites, while *Axonopus compressus* showed the broadest distribution, occurring in eight locations across the study area. The occurrence of these species across multiple sites suggests their adaptability to the prevailing environmental conditions and their extensive use in campus landscaping. Table 4 summarizes the diversity indices calculated for the seventeen study sites. Site 3 (Sports Unit) recorded the highest Shannon–Wiener diversity index ($H' = 1.427$), indicating greater species richness and a more even distribution of ornamental plants compared to other locations. Conversely, Sites 13, 16, and 17 exhibited a Shannon diversity value of zero, suggesting the presence of only one species or extremely low species diversity. Species evenness values ranged from 0.3228 to 1.000, reflecting varying degrees of uniformity in species distribution among the sites. Fisher's alpha diversity index was also highest at Site 3 (4.632), followed by Site 1 (3.878), indicating a more heterogeneous and diverse ornamental plant composition in these locations.

4.0 DISCUSSION

The floristic composition and diversity of ornamental plants recorded across the seventeen surveyed sites within the University of Delta, Agbor, provide valuable insights into the institution's landscaping practices, ecological conditions, and biodiversity conservation potential. The occurrence of seventeen ornamental plant species distributed among several botanical families demonstrates a moderate level of plant diversity within the campus environment. Such diversity is characteristic of educational institutions where ornamental plants are intentionally introduced not only for beautification purposes but also for environmental enhancement, shade provision, erosion control, carbon sequestration, and microclimate regulation [11]. The dominance of species such as *Juniperus chinensis*, *Araucaria columnaris*, *Tecoma stans*, *Croton zambesicus*, and *Axonopus compressus* recorded could be attributed to somewhat variation. The dominance of these species could be attributed to differences in their ecological adaptability, ornamental value, and management requirements. These species possess characteristics that make them particularly suitable for landscaping and urban greening projects. This finding corroborates the report by [12], who reported plant species selected for urban landscapes are often capable of tolerating environmental stresses such as drought, soil compaction, pollution, and fluctuating climatic conditions while maintaining their ornamental value, they are also preferred due to relatively low maintenance and provide year-round aesthetic benefits. Additionally, the widespread nature of *Juniperus chinensis* and *Araucaria columnaris* is valued due to its ecological relevance and adaptability to the environment. This finding is understandable since *Juniperus chinensis* and *Araucaria columnaris* have wide tolerance capability range. According to the report of [13], *Juniperus chinensis* and *Araucaria columnaris* are widely utilized in landscaping due to their evergreen nature, tolerance to a broad range of environmental conditions, and distinctive architectural forms, which contribute significantly to landscape structure and visual quality. The dominance nature of *Tecoma stans* could be attributed to their rapid growth rate, and ability to withstand periods of water stress hence their relevance to urban biodiversity. This corroborates the report by [12], who showed that *Tecoma stans* rapid growth, prolonged flowering period, and adaptability to tropical and subtropical environments, making it a popular ornamental species in public landscapes. The prevalence of *Croton zambesicus* may be associated with its attractive foliage, adaptability to tropical climates, and ease of maintenance, characteristics that enhance its suitability for ornamental planting [14]. Furthermore, *Axonopus compressus* is commonly used as a lawn and ground-cover species because of its ability to form dense turf, tolerate trampling, suppress weed growth, and reduce soil erosion, thereby improving both the functional and aesthetic quality of landscaped areas [15]. According to [16], urban green spaces are often designed using plant species that combine ecological resilience with aesthetic functions, ensuring sustainability and long-term landscape performance. Therefore, the dominance of these species within the University of Delta campus likely reflects deliberate selection based on their ability to thrive under local environmental conditions while providing ecological, recreational, and visual benefits. The widespread occurrence of *Juniperus chinensis*, particularly its highest abundance at the Faculty of Nursing (Site 9), may be attributed to several biological and horticultural characteristics that enhance its performance in managed landscapes. As an evergreen conifer, *J. chinensis* retains its foliage throughout the year, ensuring continuous aesthetic value irrespective of seasonal changes. This characteristic makes it highly desirable in institutional environments such as universities, hospitals, and public parks, where attractive landscapes are maintained year-round to create a pleasant and welcoming environment. The species is also well known for its adaptability to a wide range of soil types, including sandy, loamy, and moderately compacted soils commonly



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found in urban settings. Its extensive root system enables efficient water uptake, allowing it to tolerate periods of drought and limited soil moisture. Furthermore, *J. chinensis* exhibits considerable resistance to environmental stresses such as high temperatures, wind exposure, air pollution, and soil nutrient fluctuations, conditions that often affect the survival of ornamental plants in urban and semi-urban landscapes [13]. The high abundance recorded at the Faculty of Nursing may further reflect deliberate planting decisions aimed at enhancing environmental aesthetics and providing a calm atmosphere conducive to learning and healthcare-related activities. Evergreen trees and shrubs are often selected around academic and healthcare facilities because their permanent green foliage contributes to psychological well-being, environmental beautification, and microclimate regulation. In addition, the dense foliage of *J. chinensis* can reduce dust accumulation, intercept pollutants, and provide shade, thereby improving environmental quality around buildings. Ecologically, the dominance of *J. chinensis* may indicate its successful adaptation to local climatic conditions within the study area. Species that are capable of establishing, surviving, and maintaining healthy growth under prevailing environmental conditions are more likely to persist and become dominant within ornamental landscapes. According to [13], Chinese juniper is among the most adaptable ornamental conifers, exhibiting high tolerance to drought, pruning, and urban environmental conditions. Similarly, urban landscape studies have shown that the species maintains high survival rates and aesthetic quality under moderate maintenance regimes, making it one of the most frequently planted ornamental conifers in institutional and urban landscapes [12]. The diversity indices generated from the study reveal significant variations in species composition among the surveyed sites. Site 3 (Sports Unit) recorded the highest Shannon-Wiener diversity index ($H' = 1.427$). The high Shannon diversity index could be attributed to the diversity nature of ornamental plants indicating a relatively balanced distribution of species and a higher level of ecological heterogeneity. Several factors may account for the higher diversity observed in the Sports Unit. According to [17], Shannon diversity values increase with both species' richness and evenness, suggesting that the Sports Unit supports a more complex ornamental plant community compared to other locations. Such complexity is often associated with greater ecological stability because resources are utilized by multiple species rather than being monopolized by a few dominant taxa. Consequently, diverse ornamental communities are generally more resilient to environmental disturbances, pest infestations, and disease outbreaks. The high diversity observed at the Sports Unit may be attributed to several interacting environmental and management factors. Open spaces typically provide better sunlight availability, which supports the growth of a wider range of ornamental species. Additionally, recreational areas often receive greater maintenance attention, including watering, pruning, fertilization, and weed control. These management practices create favorable conditions for the establishment and persistence of diverse plant assemblages. Similar findings have been reported by [18], who observed that urban green spaces receiving regular maintenance often exhibit significantly higher plant diversity than neglected landscapes. In contrast, Sites 13, 16, and 17 exhibited Shannon diversity values of zero. The Shannon diversity index with zero value could be attributed to the dominance of single ornamental plant species. It shows the complete absence of species diversity by showing the dominance of a particular species. These findings may reflect prioritization of infrastructure development over landscape enhancement in these areas. The absence of diverse vegetation in such locations reduces their ecological functionality and limits the environmental services that ornamental landscapes can provide. Furthermore, low-diversity landscapes often exhibit reduced resilience to climatic stress and biological disturbances [18]. The dominance indices calculated for several sites provide additional evidence of uneven species distribution. The dominance record of 1.00 found in Site 13, could be said to indicate a complete concentration of individuals within a single species. Similarly, Site 7 exhibited a very high dominance index, suggesting that one species overwhelmingly controlled the plant community. While such uniformity may simplify maintenance and create a neat visual appearance, ecological theory consistently demonstrates that monoculture systems are inherently vulnerable to disturbances. Alvey [19] noted that landscapes dominated by a single species are particularly susceptible to pest outbreaks, diseases, and environmental stressors because the lack of species diversity reduces ecological buffering capacity. Consequently, reliance on a few ornamental species may compromise the long-term sustainability of campus landscapes. The distribution patterns of ornamental herbs and grasses further illustrate the ecological adaptability of certain species. *Ixora coccinea* and *Axonopus compressus* were among the most widely distributed species, occurring across multiple locations. The extensive distribution of *Ixora coccinea* can be attributed to its tolerance of tropical climatic conditions, attractive floral display, and suitability for hedges and borders. Its year-round flowering habit makes it a popular choice in ornamental landscaping throughout tropical regions. Likewise, *Axonopus compressus* demonstrated exceptional adaptability, occurring in eight locations. This grass species is widely recognized for its ability to establish dense ground cover, suppress weeds, reduce soil erosion, and tolerate moderate drought conditions. Its widespread occurrence indicates its importance as a functional landscaping component within the campus environment. According to FAO [20], *A. compressus* is particularly valuable in tropical landscapes because of its low maintenance requirements and environmental resilience. Species



richness and evenness analyses further reinforce the ecological significance of Site 3. The site recorded the highest species richness (Taxa_S = 5), high evenness (0.8333), and the highest Fisher's alpha diversity index (4.632). Fisher's alpha is often regarded as a reliable measure of diversity because it is less influenced by sample size and provides a robust estimate of community heterogeneity. The high Fisher's alpha value observed at the Sports Unit therefore indicates the presence of a relatively heterogeneous ornamental plant community. High evenness values suggest that species were represented by comparable numbers of individuals rather than being dominated by a few abundant taxa. Such balanced communities are generally associated with improved ecosystem functioning and greater ecological resilience. The ecological implications of ornamental plant diversity extend beyond aesthetics. Diverse ornamental landscapes contribute significantly to ecosystem service provision within urban and institutional environments. Vegetation moderates temperature through shading and evapotranspiration, thereby reducing heat stress and mitigating urban heat island effects. Trees and shrubs also improve air quality by capturing particulate matter and absorbing atmospheric pollutants. Additionally, flowering ornamental plants provide nectar and pollen resources for pollinators such as bees, butterflies, and other beneficial insects. Tzoulas *et al.* [21] and Aronson *et al.* [22] emphasized that urban vegetation plays a crucial role in supporting biodiversity conservation while simultaneously enhancing human well-being. Therefore, the ornamental plant communities within the University of Delta contribute not only to visual enhancement but also to ecological sustainability and environmental health. The observed distribution patterns also reflect the interaction between human management decisions and environmental conditions. Landscape design often determines which species are introduced into specific locations based on intended aesthetic outcomes, available space, maintenance capacity, and environmental suitability. Consequently, variations in diversity among sites may reflect differences in management intensity, irrigation availability, soil fertility, and exposure to human disturbance. Areas receiving frequent maintenance and investment generally support richer and more diverse plant communities than neglected sites. Despite the relatively diverse ornamental flora documented during this study, the uneven distribution of species among sites indicates opportunities for improvement. Several locations exhibited low diversity and limited species representation, suggesting gaps in landscape planning and management. Increasing species richness within these areas through the introduction of suitable native and non-invasive exotic ornamental plants could enhance ecological stability and improve overall campus biodiversity. Native species are particularly valuable because they are often better adapted to local environmental conditions and provide greater support for indigenous wildlife populations. Furthermore, diversification of ornamental plantings would reduce dependence on a small number of species and minimize the ecological risks associated with monocultures.

5. CONCLUSION

The floristic survey of ornamental plants within the University of Delta, Agbor, revealed a rich diversity of ornamental species distributed across the campus landscape. A total of 17 ornamental plant species belonging to several botanical families were identified through direct field observation and taxonomic assessment. The dominance of species such as *Juniperus chinensis*, *Tecoma stans*, *Araucaria columnaris*, *Croton zambesicus*, *Cycas revoluta*, and *Roystonea oleracea* highlights their importance in campus beautification, landscaping, and environmental enhancement. The study demonstrates that the university campus serves as an important reservoir of ornamental plant diversity, contributing to aesthetic value, microclimatic regulation, biodiversity conservation, and educational opportunities for students and researchers. Proper documentation and identification of these species provide baseline information for future ecological, horticultural, and conservation studies. It is recommended that the university management should use this crucial baseline data, which can be directly applied to eco-friendly campus landscaping, local biodiversity conservation, and the economic commercialization of horticulture. Future research effort should be geared towards investigating the most efficient propagation techniques for native ornamental species found in the surveyed area, as well as evaluate how these ornamental plants act as bio-indicators for environmental stress or air pollution from heavy vehicular traffic along major roads surrounding the campus axis in Agbor.

DECLARATIONS

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Uwagboi¹ and Konyeme: Floristic Survey of Ornamental Plants in the University of Delta Main Campus, Agbor, Nigeria

Authors contributions

Mrs Sandra I. Uwagboi conceptualized the work, did the sample analysis and wrote the manuscript. Dr. Thelma E. Konyeme conducted the sample collection and processing. All authors read and approved the manuscripts.

Ethical Requirements

The plant samples were authenticated at the herbarium unit by a taxonomic expert in the Department of Biological Sciences, University of Delta, Agbor, Delta State, Nigeria

Conflict of interest

The authors declared no conflict of interest.

AI Disclosure

Generative artificial intelligence tools were not used in the preparation of this manuscript.

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