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# Ornamental Flora in Landscaped Urban Areas: The Case of the University of San Pedro (South-West of Côte d'Ivoire)

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**Abstract** **Original Research Article**

In a context where urban green spaces play a crucial role in improving quality of life and ecological sustainability, this study focuses on the ornamental flora of the University of San Pedro (USP), located in the south-west of Côte d'Ivoire. The aim is to characterise this flora and analyse the typology of the landscaped green spaces, reflecting the university's commitment to a sustainable and aesthetic environment. The methodology adopted was based on an itinerant survey of all the university's green spaces, enabling ornamental species to be identified and listed. The data collected was analysed in terms of floristic composition, biological and morphological types, geographical distribution and ornamental uses, using recognised botanical references. The survey identified 52 ornamental species in 48 genera and 31 families, with the Apocynaceae, Euphorbiaceae and Araceae families predominating. Most of the flora is made up of introduced species (86%), mainly of Asian origin, while local species are poorly represented. Shrubs and bushes dominate, with a variety of decorative characteristics such as foliage, flowers and habit. In addition, a near-threatened species on the IUCN red list has been identified, underlining the ecological importance of these areas. These results show the richness and diversity of USP's flora, while highlighting the need to make greater use of indigenous species. The study also highlights the role of university landscaping in promoting biodiversity and creating sustainable, aesthetically pleasing spaces in urban environments.

**Keywords** Ornamental Flora, Urban Biodiversity, Landscaping, Exotic Species, Sustainable Development.



## INTRODUCTION

Ornamental plants, through the beauty of their flowers or foliage, their fruit and their habit, are of aesthetic, economic and cultural interest to the people who use them (Kosh-Komba, 2022). They are used in various ceremonies such as births, weddings, deaths, anniversaries, etc. (Aké-Assi, 1996). They also help to improve the living environment and health of urban populations (Fall and Fall, 2001); (Aké-Assi, 2010); (Duchemin *et al*., 2010); (Radji *et al*., 2010), (Regnier, 2014). Nowadays, working with ornamental plants has become a basic reference for landscape architecture and urban planning. Indeed, there is great interest in the benefits of vegetation in the urban environment, as it plays a very significant role in the sustainability of urban space and sustainable development in general (Touirat, 2016). Given the ecological, socio-economic and cultural roles that plants play in a space (SEGUENA *et al*., 2010), the University of San-Pedro (USP) was quick to embrace nature by including vegetated spaces in its development plan and strategies. However, the heavy human intervention in the creation of green spaces in urban establishments can influence the composition and diversity of the flora present (Kouadio, 2016). Moreover, to date few studies have focused on the ornamental species used in landscaped university spaces and the resulting ornamental quality. It is therefore necessary to carry out a post-development assessment of the ornamental plant potential of developed spaces. It is in this context that this study was initiated. Its aim is to assess the ornamental plant composition of the green spaces at the University of San Pedro.

## MATERIEL AND METHODS

### Description of the Study Sites

The University of San-Pedro (USP) is located in the town of San-Pedro in the Bas-Sassandra district of south-west Côte d'Ivoire at latitude 4° 44′ 41″ north and longitude 6° 38′ 23″ west (Figure 1). With a surface area of 302 ha, this university opened its doors on 01 October 2021 with the mission of training students in the fields of Agriculture, Marine Sciences and Hospitality. Originally covered by a large primary forest characterised by immense expanses of tall green trees, the lush vegetation of the town of San-Pedro is today represented by the classified forests of Monogaga; Rapides Grah; and Haute Dodo and the TAÏ NATIONAL PARK (Kouassi, 2010). San Pedro's climate is subequatorial with two rainy seasons and two dry seasons (ANADER, 2017). Average rainfall in the region is 1,530 mm per year, spread over an average of 111 days a year. The Department of San-Pedro is watered by two main rivers: the San-Pedro and the Néro. The relief is a succession of lowlands, plains, low hills and sacred mountains. The region's soils are ferruginous and subject to heavy leaching due to high rainfall.

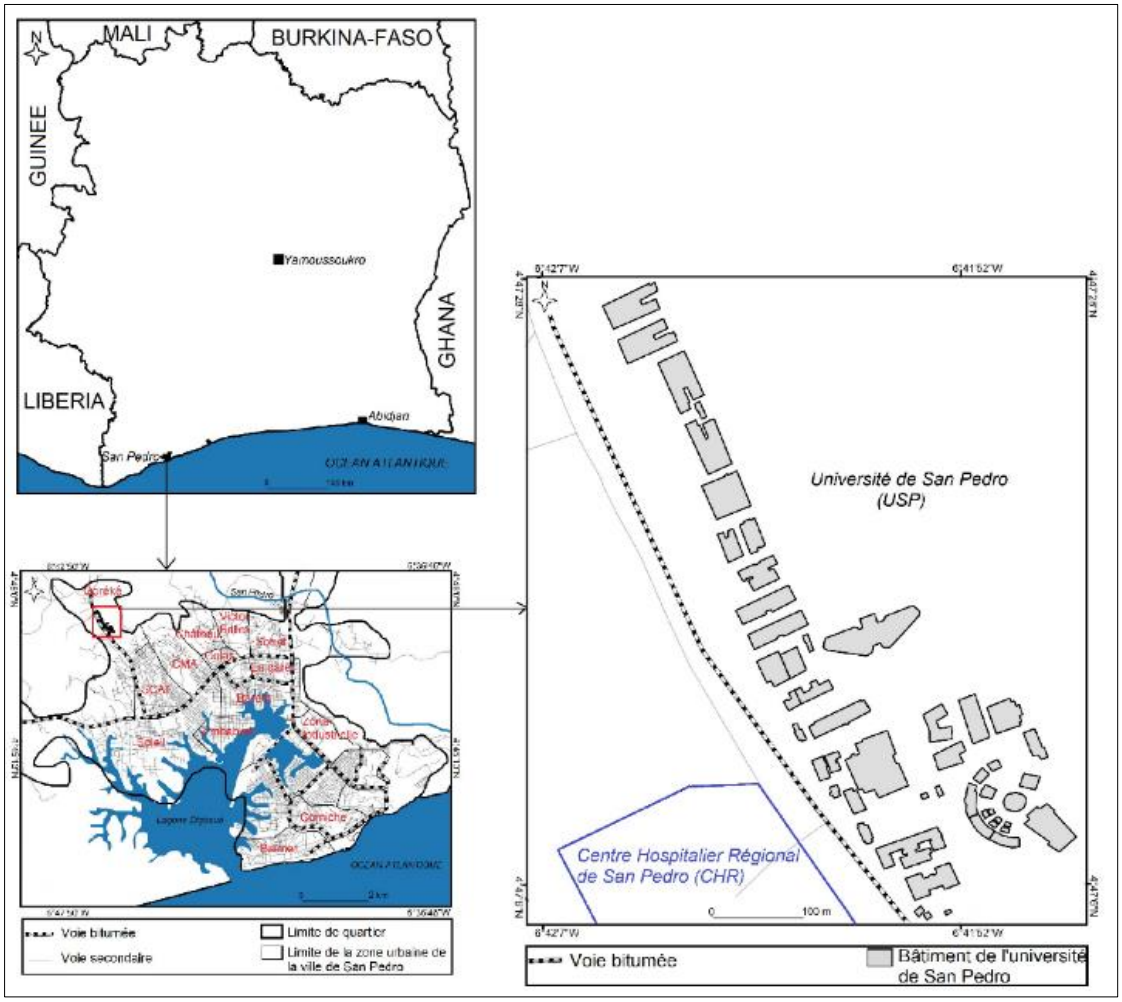


**Figure 1: Geolocation map of the University of San Pedro**

## DATA COLLECTION

In this study, the roving survey method was adopted for data collection (AKE ASSI, 1984). This consisted of walking the landscaped university area in all directions, noting all the ornamental plant species encountered. The species encountered were identified and listed. Fertile samples were collected in order to build up a herbarium for verifying direct determinations. These verifications were made using the work of Aké-Assi (2002), Porter *et al*., (2004), Aké-Assi *et al*., (2010) and Aké-Assi E. (2015) and by comparison with specimens in the Herbarium of the Centre National de Floristique (CNF). The nomenclature used in this study is that of the phylogenetic classification of the Angiosperm Phylogeny Group (APG) in its latest version known as (APG IV 2016).

### Analysis of the Data

The analysis of the data collected consisted in determining from the list obtained the number of species, genera and families of flora recorded during the inventories and calculating the corresponding percentages. The species were classified according to biological and morphological types, phytogeographical distribution, special status, decorative characteristics and

their spatial position (mode of use) in the university landscape. For these various classifications, the work of (Raunkiaer 1934), (Aké Assi 1984), and (Aké Assi 2001; 2002; 2015), (Dieng *et al*., 2019), (Kosh-Komba *et al*., 2021), (UICN 2024) served as a basis. Ornamental plant diversity was expressed using generic diversity and family indices.

The generic diversity index (IDg) or generic coefficient (Cg) (1) is given by the ratio between the number of genera and the number of species:
IDg = G/E with G= number of genera; E= number of species.

The family diversity index (IDf) or family diversity coefficient (Cf) (2) is given by the ratio between the number of families and the number of species:
IDf = E/F where F=number of families; E=number of species.

The more diverse a flora is, the fewer large genera and multi-specific families it contains. In other words, the flora is diverse when the index of families making up the flora is generally low. High values of this coefficient characterise impoverished flora (Aké-Assi *et al*., 2020).

## RESULTS

### Typology of Eco-Landscaped Areas

During the floristic inventory, two types of eco-landscaped areas were observed. These were open spaces and semi-vegetated surfaces, represented in our study by honeycomb constructions. In the case of open spaces, the topsoil is directly linked to the natural soil strata. They are represented by areas with ground cover and other types of vegetation, either shrubs, trees or herbaceous plants, areas with ground cover only, and areas with decorative gravel surrounding a few plants (Figure 2).


**Figure 2: Illustration of open-ground areas with ground cover and other types of vegetation (a), with ground cover only (b) and with decorative gravel surrounding a few plants (c)**

In the case of honeycomb structures, there is either grass or a few plants. In these systems, the topsoil is not in direct contact with the natural soil strata and plant growth is limited (Figure 3).

**Figure 3: Overview of a semi-vegetated surface showing cells being revegetated**

### Flora Richness

The floristic inventory identified a total of 52 ornamental species, divided into 48 genera and belonging to 31 families. Table 1 provides a summary, indicating for each species its biological type (TB), morphological type (TM), phytogeographical distribution (RG) and ecological status. With the exception of the genera Ixora and Terminalia, which

each contain two species, all the others are monospecific. In this flora, the Apocynaceae were the most dominant with 11.53%, followed by the Euphorbiaceae (9.61%), Araceae (7.69%), Acanthaceae and Poaceae (5.76%) and the Agavaceae, Combretaceae, Fabaceae, Malvaceae and Rubiaceae, which each accounted for 3.84% of the flora recorded. The 21 other families were poorly represented, accounting for 1.92% of the species recorded (Table 2).

**Biological Type**

Analysis of figure 4 shows that the ornamental flora recorded is mainly represented by Nanophanerophytes, Macrophanerophytes and Mesophanerophytes, with 17 species (32.70%), 16 species (30.77%) and 11 species (21.15%) respectively. The other biological types are poorly represented, with 4 species (7.7%) for Chamephytes, 3 species (5.77%) for Geophytes and 1 species (1.92%) for Therophytes.

**Morphological Type**

The morphological spectrum of this flora is dominated by shrubs, which account for 48.08% or 25 species overall. Trees, representing 26.92% or 14 species, and herbaceous plants, evaluated at 25% or 13 species, are not negligible in this flora (Figure 5).

**Tableau 1: Summary of ornamental species found on the landscaped site of the University of San Pedro**

| N° | Species | Family | TB | TM | Phytogeographical distribution | Ornamental organ |
|---|---|---|---|---|---|---|
| 1 | Acacia mangium Willd. | Fabaceae | mP | a | Australia and South-East Asia | appearence ornamental |
| 2 | Acalypha Wilkesiana Mull. Arg. | Euphorbiaceae | np | b | oceanie | decorative foliage |
| 3 | Adenium obesum Forsk.) Roem. Et Schult. | Apocynaceae | np | b | Africa | Organs combined decorative |
| 4 | Adonidia merrillii (Becc.) Becc | Araceae | mp | a | Philippines-Malaysia | decorative foliage |
| 5 | Agave angustifolia Haw. | Agavaceae | Ch | h | Mexico | appearence ornamental |
| 6 | Agave sisalana Perrine | Agavaceae | Ch | h | Mexico | appearence ornamental |
| 7 | Aloe vera | Xanthorrhoeaceae | np | b | South Africa, Madagascar, Cape Verde | appearence ornamental |
| 8 | Alternanthera brasiliensis (L.) Kuntze, 1891 | Amaranthaceae | np | h | Brazil | decorative foliage |
| 9 | Allamanda cathartica L. | Apocynaceae | mp | b | Am | Decorative flowering |
| 10 | Annona muricata L. | Annonaceae | mp | b | Pan | appearence ornamental |
| 11 | Axonopus compressus (Sw.) P.Beauv. | Poaceae | G | h | Africa | decorative foliage |
| 12 | Bambusa multiplex (Lour.) Raeusch. | Poaceae | mp | h | South-East Asia | decorative foliage |
| 13 | Barleria Lupulina Lindl. | Acanthaceae | mp | b | Madagascar | Decorative flowering |
| 14 | Bougainvillea glabra Choisy. | Nyctaginaceae | mp | b | Brazil | Plante à floraison decoratif |
| 15 | Breynia disticha J.R.Forst.& G.Forst | Pyllanthaceae | np | b | Pacific Islands | Decorative flowering |
| 16 | Caladium bicolor (Aiton) Vent | Araceae | G | h | Brazil | decorative foliage |
| 17 | Carica papaya L. | Caricaceae | mp | b | Pan | appearence ornamental |
| 18 | Catharanthus roseus (L.) G. Don | Apocynaceae | np | b | Madagascar | Decorative flowering |
| 19 | Codiaeum variegatum (L,) Rumph. E | Euphorbiaceae | np | b | Malaysia Oceania | decorative foliage |
| 20 | Cordyline fruticosa (L.) A.Chev. | Dracaenaceae | mp | b | India | decorative foliage |
| 21 | Cocos nucifera L. | Arecaceae | MP | a | Malaysia | appearence ornamental |
| 22 | Chrysopogon zizanoides (L.) Roberty | Poaceae | np | h | India | decorative foliage |
| 23 | Delonix regia (Bojer ex Hook.) Raf. | Fabaceae | mp | a | Madagascar | Decorative flowering |
| 24 | Dieffenbachia picta (jacq.) schott | Araceae | np | b | Central America | decorative foliage |
| 25 | Duranta erecta L. | Verbenaceae | np | b | Pt | decorative foliage |
| 26 | Eucalyptus globulus Labill. | Myrtaceae | mP | a | Australia | appearence ornamental |
| 27 | Eupatorium capillifolium | Asteraceae | np | h | United states | decorative foliage |
| 28 | Euphorbia milii Des. Moul. | Euphorbiaceae | Ch | b | Madagascar | Organs combined decorative |
| 29 | Euphorbia tirucalli L. | Euphorbiaceae | np | b | Malaysia | Plant appearence ornamental |
| 30 | Ficus benjamina L. | Moraceae | mP | a | Brazil | decorative foliage |
| 31 | Heliconia psittacorum L.f. | Heliconiaceae | mp | h | Tropical Asia | Decorative flowering |
| 32 | Hibiscus rosa-sinensis | Malvaceae | np | h | China and India | Decorative flowering |
| 33 | Ixora chinensis Lam. | Rubiaceae | np | b | China and India | Decorative flowering |
| 34 | Ixora coccinea L. | Rubiaceae | np | b | West Indies | Decorative flowering |

| | | | | | | |
|---|---|---|---|---|---|---|
| 35 | Jatropha integerrima Jacq. | Euphorbiaceae | mp | b | As/ Tropical Asia, | Decorative flowering |
| 36 | Justicia gendarusa | Acanthaceae | np | h | Mascarene Islands | decorative foliage |
| 37 | Kigelia africana (Lam.) Benth. | Bignoniaceae | Mp | a | Tropical Africa | Organs combined decorative |
| 38 | Livistona chinensis (Jacq) R.Br. Ex Mart. | Araceae | Mp | a | Asia | decorative foliage |
| 39 | Mangifera indica L. | Anacardiaceae | mP | a | Asia | Organs combined decorative |
| 40 | Musa paradisiaca L. | Musaceae | G | b | Tropical Asia | Organs combined decorative |
| 41 | Nerium oleander L. | Apocynaceae | mp | b | Mediterranean region | Decorative flowering |
| 42 | Plumeria alba L. | Apocynaceae | mp | a | Tropical America | Organs combined decorative |
| 43 | Ravenala madagascariensis Adans. | Strelitziaceae | mP | a | Madagascar | Organs combined decorative |
| 44 | Rauvolfia vomitoria Afzel. | Apocynaceae | mp | b | Africa/ Ivory Coast | appearence ornamental |
| 45 | Tectona grandis L.f. | Lamiaceae | mP | a | India | appearence ornamental |
| 46 | Terminalia catappa L. | Combretaceae | mp | a | India | appearence ornamental |
| 47 | Terminalia mantaly H.Perrier | Combretaceae | mp | a | Madagascar | appearence ornamental |
| 48 | Theobroma cacao L. | Malvaceae | mp | b | Amazonia | appearence ornamental |
| 49 | Thunbergia erecta(Benth.) T.Anderson | Acanthaceae | np | b | West Africa | Decorative flowering |
| 50 | Turnera ulmifolia L. | Passifloraceae | Th | h | Tropical America | Organs combined decorative |
| 51 | Tradescantia spathacea Sw. | Commelinaceae | Ch | h | America | decorative foliage |
| 52 | Yucca aloifolia L. | Asparagaceae | mp | b | Tropical America | appearence ornamental |

TB : biological type; TM: Morphological type; a : tree; b: schrubs; h: grass ; Ch:; G:; mp:; Th:; Mp

**Table 2: Distribution of species by family**

| Family | Species number | Proportion (%) |
|---|---|---|
| Apocynaceae | 6 | 11,53 |
| Euphorbiaceae | 5 | 9,61 |
| Araceae | 4 | 7,69 |
| Acanthaceae | 3 | 5,76 |
| Poaceae | 3 | 5,76 |
| Agavaceae | 2 | 3,84 |
| Combretaceae | 2 | 3,84 |
| Fabaceae | 2 | 3,84 |
| Malvaceae | 2 | 3,84 |
| Rubiaceae | 2 | 3,84 |
| Amaranthaceae | 1 | 1,92 |
| Anacardiaceae | 1 | 1,92 |
| Annonaceae | 1 | 1,92 |
| Arecaceae | 1 | 1,92 |
| Asparagaceae | 1 | 1,92 |
| Asteraceae | 1 | 1,92 |
| Bignoniaceae | 1 | 1,92 |
| Caricaceae | 1 | 1,92 |
| Commelinaceae | 1 | 1,92 |
| Dracaenaceae | 1 | 1,92 |
| Heliconiaceae | 1 | 1,92 |
| Lamiaceae | 1 | 1,92 |
| Moraceae | 1 | 1,92 |
| Musaceae<br>Myrtaceae<br>Nyctaginaceae<br>Passifloraceae<br>Pyllanthaceae<br>Strelitziaceae<br>Verbenaceae<br>Xanthorrhoeaceae | 1 | 1,92 |
| Total | 52 | 100 |

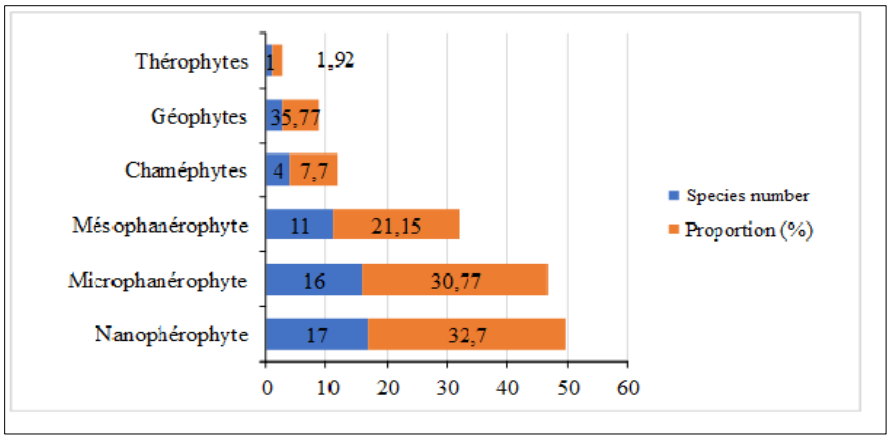


**Figure 4: Histogram of the distribution of ornamental species surveyed according to biological type**

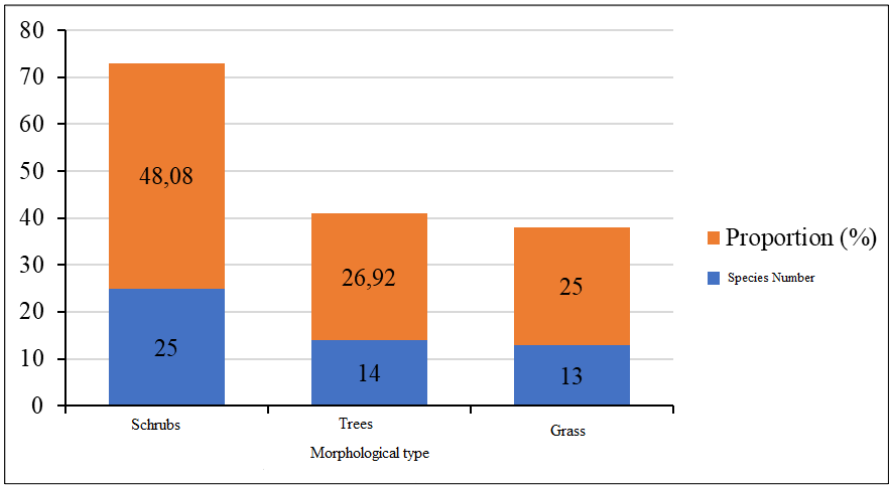


**Figure 5: Histogram of the distribution of ornamental species surveyed according to morphological type**

**Origin of Ornamental Plants in the USP**

The distribution of species according to phytogeographical affinities showed that introduced species are the most numerous with 45 species or 86% (Figure 6). Species belonging to the Guinéo-Congolaise (GC) region, characteristic of the dense forests of Côte d'Ivoire, Guinéo-Congolaise-Sudano-Zambézian (GC-SZ) link species generally found in the shrubby savannahs of Côte d'Ivoire and species in the Sudano-Zambézian (SZ) region, naturally located in the northern part of the country, are the least represented, with respectively 4 species (8%), 2 species (4%) and 1 species (2%). Among the introduced species, 36% or 17 species of the USP ornamental flora come from Asia, 30% or 14 species from America, 19% or 9 species from Africa, 11% or 5 species from Oceania and 4% or 2 species from Europe (Figure 7).

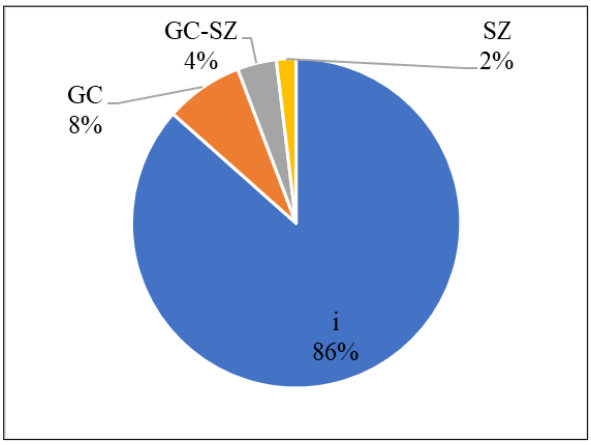


**Figure 6: Phytogeographical distribution spectrum of species at national level**

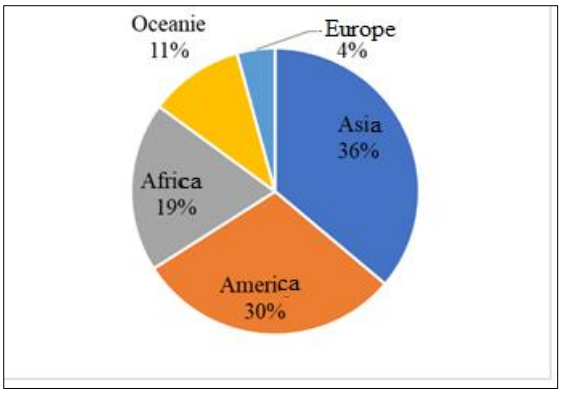


**Figure 7: Distribution spectrum of introduced species by continent of origin**

**Special Status of the Ornamental Species Recorded**

Of the ornamental plants recorded on the University of San Pedro site, *Adonidia merrillii* (Becc.) Becc (Araceae) is the only species listed by the IUCN as Near Threatened (NT), Figure 8.

**Figure 8: View of a foot of *Adonidia merrillii* (Becc.) Becc. (Arecaceae)**

**Flora Diversity**

Overall, genus indices, like family indices, are low (Table 3). The five families with the highest diversity indices are, in descending order, the Apocynaceae, Euphorbiaceae, Araceae, Acanthaceae and Poaceae.

**Table 3: Genus and family diversity indices for the ornamental flora of the University of San Pedro**

| Family | Species number | Genus number | Generic diversity index (IDg) | Family diversity index |
|---|---|---|---|---|
| *Apocynaceae* | 6 | 6 | 0,11538462 | 0,19354839 |
| *Euphorbiaceae* | 5 | 5 | 0,09615385 | 0,16129032 |
| *Araceae* | 4 | 4 | 0,07692308 | 0,12903226 |
| *Acanthaceae* | 3 | 3 | 0,05769231 | 0,09677419 |
| *Poaceae* | 3 | 3 | 0,05769231 | 0,09677419 |
| *Agavaceae* | 2 | 2 | 0,03846154 | 0,06451613 |
| *Combretaceae* | 2 | 2 | 0,03846154 | 0,06451613 |
| *Fabaceae* | 2 | 2 | 0,03846154 | 0,06451613 |
| *Malvaceae* | 2 | 2 | 0,03846154 | 0,06451613 |
| *Rubiaceae* | 2 | 2 | 0,03846154 | 0,06451613 |
| *Amaranthaceae* | 1 | 1 | 0,01923077 | 0,03225806 |
| *Anacardiaceae* | 1 | 1 | 0,01923077 | 0,03225806 |
| *Annonaceae* | 1 | 1 | 0,01923077 | 0,03225806 |
| *Arecaceae* | 1 | 1 | 0,01923077 | 0,03225806 |
| *Asparagaceae* | 1 | 1 | 0,01923077 | 0,03225806 |
| *Asteraceae* | 1 | 1 | 0,01923077 | 0,03225806 |
| *Bignoniaceae* | 1 | 1 | 0,01923077 | 0,03225806 |
| *Caricaceae* | 1 | 1 | 0,01923077 | 0,03225806 |
| *Commelinaceae* | 1 | 1 | 0,01923077 | 0,03225806 |
| *Dracaenaceae* | 1 | 1 | 0,01923077 | 0,03225806 |
| *Heliconiaceae* | 1 | 1 | 0,01923077 | 0,03225806 |
| *Lamiaceae* | 1 | 1 | 0,01923077 | 0,03225806 |
| *Moraceae* | 1 | 1 | 0,01923077 | 0,03225806 |

| Family | Species number | Genus number | Generic diversity index (IDg) | Family diversity index |
|---|---|---|---|---|
| *Musaceae* | 1 | 1 | 0,01923077 | 0,03225806 |
| *Myrtaceae* | 1 | 1 | 0,01923077 | 0,03225806 |
| *Nyctaginaceae* | 1 | 1 | 0,01923077 | 0,03225806 |
| *Passifloraceae* | 1 | 1 | 0,01923077 | 0,03225806 |
| *Pyllanthaceae* | 1 | 1 | 0,01923077 | 0,03225806 |
| *Strelitziaceae* | 1 | 1 | 0,01923077 | 0,03225806 |
| *Verbenaceae* | 1 | 1 | 0,01923077 | 0,03225806 |
| *Xanthorrhoeaceae* | 1 | 1 | 0,01923077 | 0,03225806 |

**Decorative Organs**

The species recorded can be divided into four groups according to decorative type. These are: the flower, the decorative appearance or habit, the leaves and the combination of decorative organs (Figure 9). Leaves (32.70%) are the most common decorative feature among the species recorded. This is followed by species whose decorative character is the appearance or habit (28.85%) and the flower (23.07%). The combination of decorative organs is the least frequently observed characteristic (15.38%), Figure 10.

**Arrangement of Ornamental Plants on the University of San Pedro Site**

The ornamental flora of the University of San Pedro are divided into five categories according to their spatial arrangement. We distinguish between plants grown in isolation (30 species or 57.70%), plants in border or path alignments (8 species or 15.38%), plants grown in clumps (8 species or 15.38%), plants grown in living hedges (3 species or 5.77%) and ground cover plants or lawns (3 species or 5.77%) (Figure 11). Isolated plants include those cultivated for the beauty of their flowers: Hibiscus rosa-sinensis, for the density and beauty of their foliage: Yucca alnifolia for the beauty of their general appearance: Ravenala madagascariensis Adans and for their fruit: Theobroma cacao (Figure 12). Alignment plants are grown for their general appearance: Acacia mangium Willd., the beauty of their flowers: Euphorbia milii and their leaves: Cordyline fruticosa (Figure 13). Tufted plants are generally grown for the beauty of their foliage: Breynia disticha, for the beauty of their flowering: Heliconia psittacorum, Turnera ulmifolia (Figure 14). Acalypha Wilkesiana, Ixora chinensis and Ixora coccinea have been grown as living hedges for the beauty of their foliage and flowers respectively (Figure 15). Axonopus compressus, Chrysopogon zizanoides and Tradescantia spathacea were grown as ground cover plants (Figure 16).

**Other Uses of Ornamental Plants at the University of San Pedro**

Several of the species recorded, apart from their predominant ornamental character, have various other uses. Table 4 summarises the other uses and the organs of these plants involved in these uses.


**Figure 9: Some ornamental species according to decorative organ, d and e: decorative flowering; f and g: general decorative appearance; h and i: decorative foliage; i and j: combination of decorative organs (foliage and fruit)**

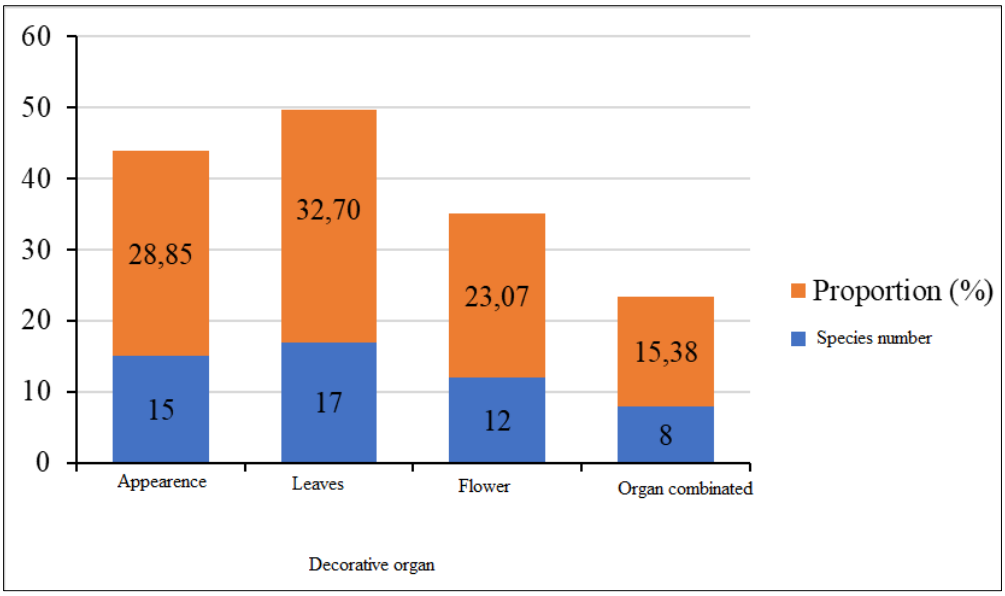


**Figure 10: Histogram of species distribution according to decorative organs**

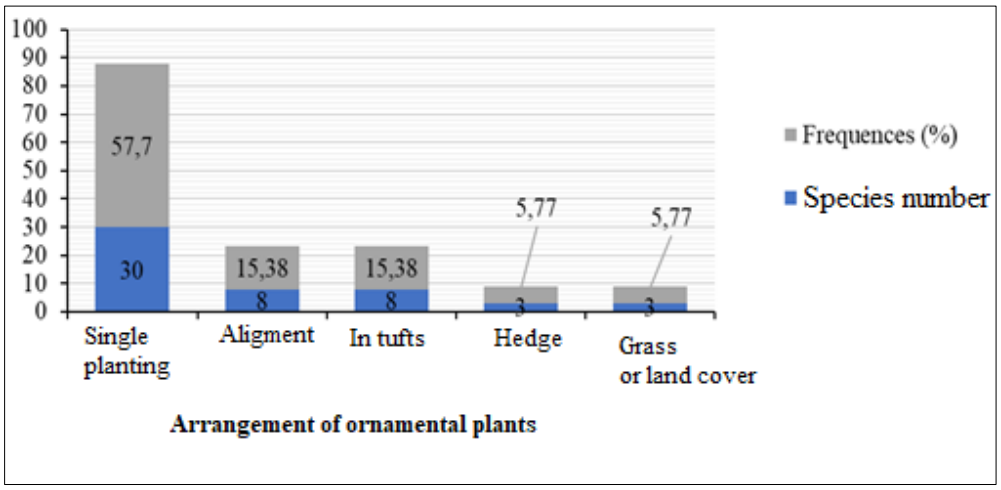


**Figure 11: Histogram of the distribution of ornamental plants according to their layout in the landscaped area of the University of San Pedro**


**Figure 12: Some ornamental species in isolation planting**


**Figure 13: View of some ornamental species in alignment planting**


**Figure 14: View of some ornamental species in tufts planting**


**Figure 15: View of some ornamental species in hedge planting**

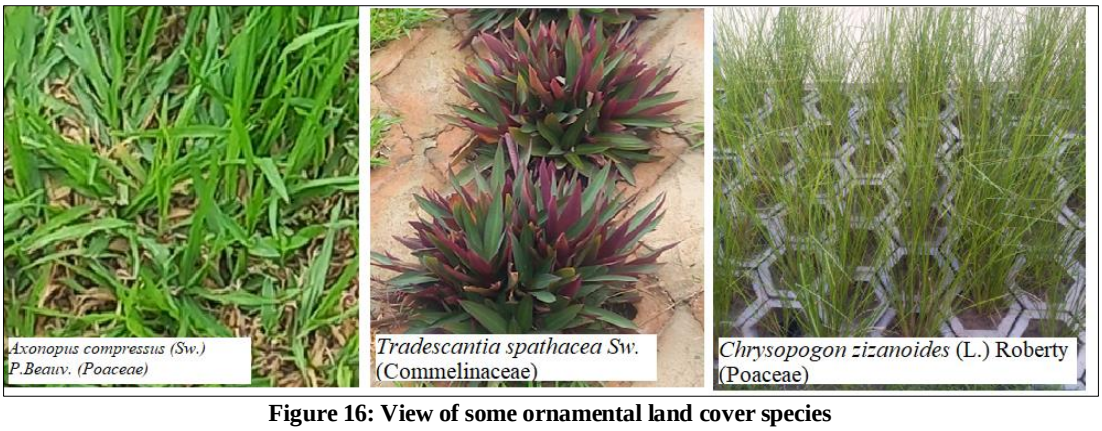


**Figure 16: View of some ornamental land cover species**

**Table 4: Various uses of ornamental plants from the University of San Pedro**

| Species | Application | Part of the plant used |
|---|---|---|
| *Allamanda cathartica* | Medicinal | Latex, leaves |
| *Aloe vera* | Medicinal; cosmetic and dermatological | Pulp or gel; latex |
| *Agave sisalana Perrine* | Textile | Textile fibre extracted from leaves |
| *Annona muricata L.* | food | Fruit |
| *Carica papaya L.* | food; médicinal | Fruit; leaves |
| *Catharanthus roseus (L.) G. Don* | Médicinal | Dried leaves and aerial parts |
| *Cocos nucifera L.* | food; cosmetics | Fruit |
| *Mangifera indica L.* | food, médicinal | Fruit, barks |
| *Musa paradisiaca L.* | food; cosmetics | Fruit, roots |
| *Nerium oleander* | Médicinal; cosmetica and dermatological | Leaves, barks, flower, |
| *Theobroma cacao* | food | Fruit |
| *Tectona grandis L.f.* | Médicinal, timber | Leaves |

## DISCUSSION

The floristic inventory carried out at the University of San Pedro identified 52 ornamental species, divided into 48 genera and belonging to 31 families. This relatively high number testifies to the wealth of ornamental flora on the site. Moreover, this flora is highly diversified, with low values for genus and family indices.

The dominance of Apocynaceae, macrophanerophytes and nanophanerophytes, shrubs and bushes can be explained by the fact that these species adapt well to the environmental conditions of the study area. Indeed, the relative importance of the biological and morphological types of a flora are strongly linked to the characteristics of the study environment (SAIDOU *et al.*, 2021). Furthermore, the dominance of species belonging to these biological and morphological types and families is strongly linked to the selection of species by man. Indeed, the work of (Kouadio *et al.*, 2016) has shown that the composition of urban ornamental flora is strongly impacted by human will. This observation is strongly perceptible in our study, since 41 species representing 86% of the ornamental flora surveyed are introduced or so-called exotic species, most of which are of Asian origin. The low representation of African species, particularly those from Côte d'Ivoire, reflects the low value placed on local or indigenous ornamental species, as highlighted by the work of (Aké-Assi, 2015). The presence of a species on the IUCN red list in the Near Threatened category proves that the University of San Pedro, through its green spaces, is contributing to the preservation of biodiversity. In addition, the diversification of eco-developed spaces offers a variety of environments conducive to the development of biodiversity and increases the ecological potential of the developed environment (IBGE, 2010). It is therefore important to encourage the design, implementation and landscape enhancement of university structures. The diversification of the decorative characteristics and arrangement of the species observed is a factor that favours the development of the attractiveness and beauty of the environment. Indeed, the aesthetic character of a site is the result of the layout and arrangement of the species chosen (Kouadio *et al.*, 2016).

## CONCLUSION

The floristic inventory carried out at the University of San Pedro shows a rich and diverse ornamental flora, with 52 species divided into 48 genera and 31 families. This variety reflects both the institution's involvement in preserving and embellishing the environment and the strong influence of exotic species (86%), particularly Asian species (36%), in the development of green spaces. Analysis of the different biological, morphological and decorative types reveals that species with decorative foliage and habit are the most predominant, adapted to local conditions and carefully chosen for their aesthetic and ecological value. The existence of an almost endangered species on the IUCN red list also testifies to the importance of these green spaces for biodiversity. The study highlights the importance of enhancing the use of indigenous species to integrate local flora more harmoniously, while continuing to promote diversified and aesthetically pleasing landscaping. These efforts will help to make university spaces models of sustainability and attractiveness in the Ivorian urban landscape.

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