

FLORISTIC INVENTORY OF THE NGOLTONGO BOTANICAL GARDEN AT SINDIA (MBOUR DEPARTMENT, SENEGAL)”

ABSTRACT

Background:

The intertropical plant world has undergone and continues to undergo major destruction and/or transformation, both in terms of ‘ecosystems’ and their components. The demographic explosion on a global scale has accentuated these new spatial modifications, by encouraging the emergence of threats: fires, slash-and-burn agriculture, savannah fires; animal introductions, plant species introductions, anthropic actions, etc. Ex situ conservation is sometimes the only chance of survival for threatened species.

Aim:

The aim of the work carried out was to make a floristic inventory of the Ngoltongo botanical garden in Sindia,

Results:

The inventory of the **Ngoltongo botanical garden** shows a relatively diverse flora with 220 species in 161 genera and 58 families. In order of importance, the Fabaceae, Arecaeae, Malvaceae, Poaceae, Apocynaceae, Euphorbiaceae and Asteraceae are the best represented. The other families, which are less well represented (0.41% each), nevertheless contribute to the diversity of the flora, particularly the monospecific families (Asparagaceae, Cyperaceae, Musaceae, etc.).

We have noted that some families are relatively abundant in terms of the number of species: in the Dicotyledonous class, these are the Fabaceae, Apocynaceae, Euphorbiaceae, Malvaceae and Rutaceae groups, with a total of 71 species. In the class of Monocotyledons, the Arecaeae are in the lead with 24 species, followed by the Poaceae with 10 species. In addition, certain genera are relatively well represented, including *Ficus* (7 species), *Cassia* (7 species) and *Euphorbia* (4 species).

Conclusion:

The Ngoltongo Botanical Garden appears to be a site of high biodiversity due to the diversity of species planted in a relatively large area. If it is to succeed in its conservation, education and scientific research missions, it is therefore important to consider: its protection against bush fires and the anthropic actions, labelling the feet of all plants and the construction of a seedbank to enable exchanges with other botanical gardens.

Keywords: Botanical garden, Floristic inventory, Ngoltongo, Sindia

1. INTRODUCTION

Biodiversity is the totality of genes, species and ecosystem in a region. It is essential for human survival and economic wellbeing and for the ecosystem function and stability [1]. The total number of species available on the earth is not determined yet however, it is estimated that the total number of animal and plant species could be between 13 and 14 millions [2]. Conservation biologists warn that 25 percent of all species could become extinct during the next twenty to thirty years [3]. Indeed, the intertropical plant world has undergone and continues to undergo major destruction and/or transformation, both in terms of 'ecosystems' and their components. The demographic explosion on a global scale has accentuated these new spatial modifications, by encouraging the emergence of threats: fires, slash-and-burn agriculture, savannah fires; animal introductions, plant species introductions, anthropic actions [4]. However, long-term changes in patterns and processes in forest systems may lead to losses in their biological diversity and may render them more susceptible to invasion [5]. Humans have extensively altered the global environment, changing global biogeochemical cycles, transforming land, and enhancing the mobility of biota. Even in national parks and wilderness areas left untouched or actively managed, populations of plant species can be threatened, particularly by the spread of invasive alien species, pests and diseases and climate change. Ex situ conservation is sometimes the only chance of survival for endangered species. In this context, botanical gardens have a major role to play in conserving and managing a wide variety of plants, not only ex situ, but also in situ in large natural areas. A botanical garden is an area set aside and maintained by an organization for growing and studying various groups of plants for aesthetic, conservation, economic, educational, recreational and scientific purposes [6].

Various programs namely, UNEP (United Nations Environmental Programme), IUBS (International Union of Biological Sciences), UNESCO (United Nations Educational Scientific and Cultural Organization), CITES (Convention on International Trade in Endangered Species) Global Biodiversity Strategy were set off for understanding and evaluating biodiversity. Global conservation of biodiversity will require efforts at multiple levels to be successful [7]. More than 160 countries have ratified the Convention on Biological Diversity (CBD), and are expected to initiate inventory of various components of biodiversity and institute measures for in situ conservation and monitoring [8]. Floristic inventory is a necessary prerequisite for much fundamental research in tropical community ecology, such as modeling patterns of species diversity or understanding species distributions [9]. Many floristic diversity studies have been conducted in different parts of world. Majority of studies focus on inventory [4, 10, 11, 13, 14 and 15].

In Senegal, more precisely in Sindhia, in order to protect biodiversity, the Ngoltongo botanical garden was created by Haddad C over an area of 50 ha, 25 ha of which is planted.

However, the insufficiency or even absence of scientific data on the flora of this garden is a major constraint that limits the implementation of development and management plans that are essential for the rational use of the NGOLTONGO's resources.

The general aim of this study is to contribute to a better understanding of the natural plant resources of the NGOLTONGO botanical garden through a floristic inventory.

2. MATERIAL AND METHODOLOGY

2.1. Study area

The Ngoltongobotanicalgarden covers 25 ha, is located in the rural community (CR) of Sindia, in the department of Mbour in the Thiesregion (Fig.1). It is bordered to the north by the rural community of Diass, to the south by the rural community of Malicounda, to the east by the district of Notto (CR Tassette), Sessène (Sandiara) and Fissel (Ndiagianiao) and to the west by the Atlantic Ocean. The Sindia CR covered an area of 158 km². Today it has 19 official villages with a population of 28,728 [16]. Sindia CR has two types of soil: tropical ferruginous soils (dior, deck, deck dior soils) and hydromorphic soils. Sindia CR has two types of soil: tropical ferruginous soils (dior, deck, deck dior soils) and hydromorphic soils. The garden is located on a laterite plateau on the slope leading down to the marble-rich soil. The current state of the soils is deteriorated by the destruction of plant cover, deforestation and over-exploitation. There is also a demographic push into the cultivated areas, which in turn advance into the wooded and grazing areas. Commercial activity is mainly in the hands of women, especially in the small-scale trade of fruit, vegetable. Fig.1 shows the localisation of study area.



Fig.1. The localisation of study area [On line <https://www.villa-saly-senegal.com/visites/geolocalisation>].

2.2. Methodology

This study was carried out in the Ngoltongo Botanical Garden from November 2022 to May 2023. We proceeded to sample the vegetation by making transects in which we delimited stations within which we carried out floristic surveys. Given the large size of the study region, we opted to choose the most accessible areas, with different plant formations and landscapes. A total of 220 samples were collected. As the common species were recognised in the field, those that were unable to identify were carefully sampled, others photographed where possible and taken back to the laboratory for identification. This task was facilitated by the uses of Berhaut flora (1967 ; 1971-1991), HUTCHINSON J. & DAZEIL J.M Flora of west tropical Africa

(1954, 1963, 1968), Senegal new flora and neighbouring regions and guides to medicinal plants (The wild fruits of Senegal by Charles HADDAD, 2000). The nomenclatures used are those of LEBRUN & STORK 1991, 1992, 1995, 1997, and the classification systems used are those of APGIII of 2009 and APGIV of 2016 and IPNI of 2024 (On line).

3. RESULTS AND DISCUSSION

3.1. Floristic inventory

The aim of botanical inventories is to describe the floristic composition of each plant formation in order to locate plant formations with a high diversity of species (primary forest) or containing rare species and to draw up an environmental protection plan.

In the Sahelian zone (Ferlo) of the JBN, we collected 220 species in 161 genera and 58 families.

Table 1 below shows the list of species inventoried in the JBN.

N°	SPECIES NAME	FAMILY	CLASS	BIOLOGICAL TYPE
1.	<i>Abrus precatorius subsp. africanus</i> Verdc.	FABACEAE	D	liana
2.	<i>Abutilon theophrasti</i> Medik	MALVACEAE	D	Herb
3.	<i>Abutilon pannosum</i> (Forst) Schl.	MALVACEAE	D	undershrub
4.	<i>Acacia holosericea var. typica</i>	FABACEAE	D	Tree
5.	<i>Acanthospermum hispidum</i> DC.	ASTERACEAE	D	Herb
6.	<i>Phoenix sylvestris</i> (L.) Roxb.	ARECACEAE	D	Herb
7.	<i>Adansonia digitata</i> L.	MALVACEAE	D	Tree
8.	<i>Adenium obesum subsp. socotranum</i> (Vierh.) <i>Lavranos</i>	APOCYNACEAE	D	undershrub
9.	<i>Agave americana subsp. americana</i>	ASPARAGACEAE	M	Herb
10.	<i>Agave cordillerensis</i> Lodé & Pino	ASPARAGACEAE	M	Herb
11.	<i>Agave polianthes</i> Thiede et Eggli	ASPARAGACEAE	M	Herb
12.	<i>Agave segurae</i> D. Guillot & P. Van der Meer	ASPARAGACEAE	M	Herb
13.	<i>Albizia chevalieri</i> (Kosterm.) Y.H. Huang	FABACEAE	D	Tree
14.	<i>Albizia julibrissin var. julibrissin</i>	FABACEAE	D	Tree
15.	<i>Albizia lebeck var. rostrata</i> Haines	FABACEAE	D	Tree
16.	<i>Samanea saman</i> (Jacq.) Merr.	FABACEAE	D	Tree
17.	<i>Aloe vera</i> (L.) Burm.f.	ASPHODELACEAE	M	Herb
18.	<i>Aloe</i> sp.	ASPHODELACEAE	M	Herb
19.	<i>Alternanthera pungens</i> Kunth	AMARANTHACEAE	D	Herb
20.	<i>Amaranthus spinosus</i> L.	AMARANTHACEAE	D	Herb
21.	<i>Amaranthus viridis</i> L.	AMARANTHACEAE	D	Herb

N°	SPECIES NAME	FAMILY	CLASS	BIOLOGICAL TYPE
22.	<i>Ampelocissus multistriata</i> (Baker) Planch.	VITACEAE	D	Herb
23.	<i>Annonamuricata</i> L.	ANNONACEAE	D	Tree
24.	<i>Annona senegalensis</i> Pers.	ANNONACEAE	D	Tree
25.	<i>Annonasquamosa</i> L.	ANNONACEAE	D	shrub
26.	<i>Archontophoenix alexandrae</i> (F.Muell.) H.Wendl et Drude	ARECACEAE	M	Tree
27.	<i>Sideroxylon spinosum</i> L.	SAPOTACEAE	D	Tree
28.	<i>Cleome viscosa</i> L.	CLEOMACEAE	D	Herb
29.	<i>Aster alpinus</i> L.	ASTERACEAE	D	Herb
30.	<i>Avicennia marina</i> (Forssk.) Vierh.	ACANTHACEAE	D	Tree
31.	<i>Azadirachta indica</i> A.Juss.	MELIACEAE	D	Tree
32.	<i>Balanites aegyptiaca</i> (L.) Delile	ZYGOPHYLLACEAE	D	Tree
33.	<i>Bauhinia rufescens</i> Lam.	FABACEAE	D	Tree
34.	<i>Bixa orellana</i> L.	BIXACEAE	D	shrub
35.	<i>Boerhavia diffusa</i> L.	NYCTAGINACEAE	D	Herb
36.	<i>Boerhavia repens</i> L.	NYCTAGINACEAE	D	Herb
37.	<i>Boscia integrifolia</i> J.St.-Hil.	CAPPARACEAE	D	shrub
38.	<i>Boscia salicifolia</i> Oliv	CAPPARACEAE	D	shrub
39.	<i>Boscia senegalensis</i> (Pers.) Lam.exPoir.	CAPPARACEAE	D	shrub
40.	<i>Boswellia neglecta</i> S.Moore	BURSERACEAE	D	shrub
41.	<i>Bougainvillea glabra</i> Choisy.	NYCTAGINACEAE	D	shrub
42.	<i>Bougainvillea spectabilis</i> Willd.	NYCTAGINACEAE	D	shrub
43.	<i>Cadaba farinosa</i> Forsk.	CAPPARACEAE	D	shrub
44.	<i>Guilandina bonduc</i> L.	FABACEAE	D	Liana
45.	<i>Tara spinosa</i> (Molina) Britton et Rose	FABACEAE	D	Tree
46.	<i>Calotropis procera</i> (Aiton) W.T.Aiton	APOCYNACEAE	D	shrub
47.	<i>Calystegia sepium</i> (L.) R. Br.	CONVOLVULACEAE	D	Herb
48.	<i>Capparis tomentosa</i> Lam.	CAPPARACEAE	D	Liana
49.	<i>Cardiospermum halicacabum</i> L.	SAPINDACEAE	D	Herb
50.	<i>Carpentaria acuminata</i> (Becc.)	ARECACEAE	M	Tree
51.	<i>Cascabela thevetia</i> (L.) Lippold	APOCYNACEAE	D	shrub
52.	<i>Cassia sieberiana</i> DC.	FABACEAE	D	Tree
53.	<i>Celtistoka</i> (Forssk.) Hepper & J.R.I. Wood	CANNABACEAE	D	Tree
54.	<i>Cereus repandus</i> (L.) Mill	CACTACEAE	D	Under shrub
55.	<i>Chrozophora senegalensis</i> (Lam) A.Juss. ex Spreng	EUPHORBIACEAE	D	Herb
56.	<i>Citrus aurantiifolia</i> (Christm.) Swingle	RUTACEAE	D	Tree
57.	<i>Citrus latifolia</i> (Tanaka ex Yu. Tanaka) Tanaka	RUTACEAE	D	Tree

N°	SPECIES NAME	FAMILY	CLASS	BIOLOGICAL TYPE
58.	<i>Citrus reticulata</i> Blanco	RUTACEAE	D	Tree
59.	<i>Citrus volkmeriana</i> V. Ten et Pasq	RUTACEAE	D	Tree
60.	<i>Clotalariaincana</i> L.	FABACEAE	D	Herb
61.	<i>Combretumaculeatum</i> Vent.	COMBRETACEAE	D	shrub
62.	<i>Combretumglutinosum</i> Perr.ex DC.	COMBRETACEAE	D	Tree
63.	<i>Combretummicrantum</i> G. Don.	COMBRETACEAE	D	Shrub
64.	<i>Combretumpaniculatum</i> Vent.	COMBRETACEAE	D	Shrub
65.	<i>Commelinabenghalensis</i> L.	COMMELINACEAE	M	Herb
66.	<i>Commiphora africana</i> O(A.Rich.) Engl.	BURSERACEAE	D	Tree
67.	<i>Commiphoramildbraedii</i> Eng.	BURSERACEAE	D	Tree
68.	<i>Commiphoramultijuga</i> (Hiern) K.Schum	BURSERACEAE	D	Tree
69.	<i>Conocarpus erectus</i> L.	COMBRETACEAE	D	Shrub
70.	<i>Copernicia gigas</i> (Ekman et Burret)	ARECACEAE	M	Tree
71.	<i>Corchorusolitorius</i> L.	MALVACEAE	D	Herb
72.	<i>Corchorustridens</i> L.	MALVACEAE	D	Herb
73.	<i>Cordia senegalensis</i> Juss.	BORAGINACEAE	D	Tree
74.	<i>Cordiasinensis</i> Lam.	BORAGINACEAE	D	Shrub
75.	<i>Cordyline fruticosa</i> (L.) A.Chev.	ASPARAGACEAE	M	Shrub
76.	<i>Crataevareligiosa</i> G.Forst.	CAPPARACEAE	D	Tree
77.	<i>Cucumis melo</i> var. <i>agretis</i> Naudin	CUCURBITACEAE	D	Herb
78.	<i>Cymbopogancaesius</i> Chiov.	POACEAE	M	Herb
79.	<i>Cyperus rotundus</i> L.	CYPERACEAE	M	Herb
80.	<i>Dalbergia melanoxylo</i> Guill.et Pett.	FABACEAE	D	Tree
81.	<i>Datura stramonium</i> L.	SOLANACEAE	D	Herb
82.	<i>Dichrostachys cinerea</i> (L.) Wight & Arn	FABACEAE	D	Shrub
83.	<i>Dictyosperma album</i> (Bory) Scheff.	ARECACEAE	M	Tree
84.	<i>Digitariasanguinalis</i> (L.) Scop	POACEAE	M	Herb
85.	<i>Diospyros mespiliformis</i> Hochst.ex A. Rich.	EBENACEAE	D	Tree
86.	<i>Chrysalidocarpus decaryi</i> (Jum.) Eiserhardt & W.J.Baker	ARECACEAE	M	Tree
87.	<i>Chrysalidocarpus madagascariensis</i> (D.T.Fish) Becc.	ARECACEAE	M	Tree
88.	<i>Pontederiacrassipes</i> Mart.	PONTEDERIACEAE	M	Herb
89.	<i>Eleusine indica</i> Gaertn.	POACEAE	M	Herb
90.	<i>Emilia sonchifolia</i> (L.) DC	ASTERACEAE	D	Herb
91.	<i>Eragrostis pilosa</i> (L.) P.Beauv.	POACEAE	M	Herb
92.	<i>Eragrostis tenella</i> (Linn.) Roem.et Schult.	POACEAE	M	Herb
93.	<i>Eriochloa vilosa</i> (Thunb.) Kunth	POACEAE	M	Herb

94.	<i>Erythrina peruviana</i> Krukoff.	FABACEAE	D	Shrub
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N°	SPECIES NAME	FAMILY	CLASS	BIOLOGICAL TYPE
95.	<i>Erythrophleumfordii</i> Oliv.	FABACEAE	D	Tree
96.	<i>Eucalyptus camaldulensis</i> Dehnh	MYRTACEAE	D	Tree
97.	<i>Euonymusjaponicus</i> Thunb.	CELASTRACEAE	D	Shrub
98.	<i>Euphorbia hypericifolia</i> L.	EUPHORBIACEAE	D	Herb
99.	<i>Euphorbiaheterophylla</i> L.	EUPHORBIACEAE	D	Herb
100.	<i>Euphorbiahirta</i> L.	EUPHORBIACEAE	D	Herb
101.	<i>Euphorbialactea</i> Haw.	EUPHORBIACEAE	D	Shrub
102.	<i>Euphorbiamilii</i> Des Moul.	EUPHORBIACEAE	D	Shrub
103.	<i>Euphorbiamilii</i> var. <i>splendeur</i> (Bojer ex Hook.) Ursch & Leandri	EUPHORBIACEAE	D	Shrub
104.	<i>Euphorbiasudanica</i> A.Chev.	EUPHORBIACEAE	D	Shrub
105.	<i>Evolvulusalsinoides</i> (L.) L.	CONVOLVULACEAE	D	Herb
106.	<i>Faidherbia albida</i> Del. A. Chev.	FABACEAE	D	Tree
107.	<i>Feretiaapodanthera</i> Del.	RUBIACEAE	D	Shrub
108.	<i>Ficus benjamina</i> L.	MORACEAE	D	Tree
109.	<i>Ficus thonningii</i> Blume	MORACEAE	D	Tree
110.	<i>Ficus lutea</i> Vahl	MORACEAE	D	Tree
111.	<i>Ficus platyfylla</i> Del.	MORACEAE	D	Tree
112.	<i>Ficus racemosa</i> L.	MORACEAE	D	Tree
113.	<i>Flueggeavirosa</i> (Roxb. & Willd.)Baill.	PHYLLANTHACEAE	D	Shrub
114.	<i>Grewiabicolor</i> Juss.	MALVACEAE	D	Shrub
115.	<i>Guiera senegalensis</i> j.f.gmel.	COMBRETACEAE	D	Shrub
116.	<i>Hibiscus cannabinus</i> L.	MALVACEAE	D	Herb
117.	<i>Loeseneriellaaficana</i> (Willd.) R.Wilczek	CELASTRACEAE	D	Liana
118.	<i>Selenicereusundatus</i> (Haw.) D.R.Hunt	CACTACEAE	D	Tree
119.	<i>Hyophorbe lagenicaulis</i> (L.H.Bailey) H.E.Moore.	ARECACEAE	M	Shrub
120.	<i>Hyparrheniahirta</i> (L.) Stapf	POACEAE	M	Herb
121.	<i>Hyphaenethebaica</i> (L.) Mart.	ARECACEAE	M	Tree
122.	<i>Mesosphaerum suaveolens</i> (L.) Kuntze	LAMIACEAE	D	Herb
123.	<i>Indigoferaastragalina</i> DC.	FABACEAE	D	Shrub
124.	<i>Indigoferatinctoria</i> L.	FABACEAE	D	Shrub
125.	<i>Ipomoeaasarifolia</i> (Desr.) Roem et Schult.	CONVOLVULACEAE	D	Herb
126.	<i>Ipomoeabatatas</i> L.	CONVOLVULACEAE	D	Herb
127.	<i>Ipomoeapes-tigridis</i> L.	CONVOLVULACEAE	D	Herb
128.	<i>Ixora coccinea</i> L.	RUBIACEAE	D	Shrub
129.	<i>Jatropha gossypifolia</i> L.	EUPHORBIACEAE	D	Herb
130.	<i>Khaya senegalensis</i> (Desr) A.Juss.	MELIACEAE	D	Tree

N°	SPECIES NAME	FAMILY	CLASS	BIOLOGICAL TYPE
131.	<i>Lactuca alaiica Kovalevsk.</i>	ASTERACEAE	D	Herb
132.	<i>Lactuca dregeana DC.</i>	ASTERACEAE	D	Herb
133.	<i>Lanneaacida A. Rich.</i>	ANACARDIACEAE	D	Tree
134.	<i>Lantana camara L.</i>	VERBENACEAE	D	Shrub
135.	<i>Leptadenialancifolia (schumach. &thonn.)</i>	APOCYNACEAE	D	Herb
136.	<i>Leptadenia lanceolata (Poir.) Goyder</i>	APOCYNACEAE	D	Herb
137.	<i>Leucaenaleucocephala (Lam.) Wit.</i>	FABACEAE	D	Tree
138.	<i>Luffa aegyptiaca (Mill.)</i>	CUCURBITACEAE	D	Herb
139.	<i>Malpighiaglabra L.</i>	MALPIGHIACEAE	D	Tree
140.	<i>Mangifera indica L.</i>	ANACARDIACEAE	D	Tree
141.	<i>Gymnosporia senegalensis (Lam.) Loes.</i>	CELASTRACEAE	D	Shrub
142.	<i>Melaleucalucadandron (L.) L.</i>	MYRTACEAE	D	Tree
143.	<i>Mitracarpushirtus (L.) DC.</i>	RUBIACEAE	D	Herb
144.	<i>Momordicabalsamina L.</i>	CUCURBITACEAE	D	Herb
145.	<i>Momordicacharantia L.</i>	CUCURBITACEAE	D	Herb
146.	<i>Moringa oleifera Lam.</i>	MORINGACEAE	D	Tree
147.	<i>Afromorus mesozygia (Stapf) E.M.Gardner</i>	MORACEAE	D	Tree
148.	<i>Musa paradisiaca L.</i>	MUSACEAE	M	Herb
149.	<i>Nerium oleander L.</i>	APOCYNACEAE	D	Shrub
150.	<i>Ocimum basilicum L.</i>	LAMIACEAE	D	Herb
151.	<i>Opuntia engelmanni var linguiformis Griff.</i>	CACTACEAE	D	Under shrub
152.	<i>Opuntia tuna (L.) Mill.</i>	CACTACEAE	D	Under shrub
153.	<i>Passiflora foetida L.</i>	PASSIFLORACEAE	D	Liana
154.	<i>Cenchrus violaceus (Lam.) Morrone</i>	POACEAE	M	Herb
155.	<i>Pergulariadaemia (Forssk.) Chiov.</i>	APOCYNACEAE	D	Herb
156.	<i>Dicliptera paniculata (Forssk.) I. Darbysh.</i>	ACANTHACEAE	D	Herb
157.	<i>Petrea volubilis L.</i>	VERBENACEAE	D	Liana
158.	<i>Phoenix dactylifera L.</i>	ARECACEAE	M	Tree
159.	<i>Phragmites australis (Cav.) Trin. Ex Steud</i>	POACEAE	M	Herb
160.	<i>Phyllanthus niruri L.</i>	PHYLLANTHACEAE	D	Herb
161.	<i>Piliostigma reticulatum (DC) Hochst.</i>	FABACEAE	D	Shrub
162.	<i>Pistia stratiotes L.</i>	ARECACEAE	M	Herb
163.	<i>Coleusamboinicus Lour.</i>	LAMIACEAE	D	Herb
164.	<i>Monoon longifolium (Sonn.) B.Xue & R.M.K.Saunders</i>	ANNONACEAE	D	Tree
165.	<i>Portulaca oleracea L.</i>	PORTULACACEAE	D	Herb
166.	<i>Neltumachilensis (Molina)</i>	FABACEAE	D	Tree

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N°	SPECIES NAME	FAMILY	CLASS	BIOLOGICAL TYPE
167.	<i>Psidiumguajava</i> L.	MYRTACEAE	D	Tree
168.	<i>Ptychospermamacarthurii</i> (H.Wendl. ex H.J.Veitch) H.Wendl. ex Hook.f.	ARECACEAE	M	Tree
169.	<i>Ptychospermamicrocarpum</i> Burret	ARECACEAE	M	Tree
170.	<i>Plumeriapudica</i> Jacq.	APOCYNACEAE	D	Tree
171.	<i>Punicagranatum</i> L.	LYTHRACEAE	D	Tree
172.	<i>Raphia sudanica</i> A.Chev.	ARECACEAE	M	Tree
173.	<i>Rhapis excelsa</i> (Thunb.) A.Henry	ARECACEAE	M	Herb
174.	<i>Rhizophora racemosa</i> G.Mey.	RHIZOPHORACEAE	D	Shrub
175.	<i>Rhynchosia minima</i> (L.) DC.	FABACEAE	D	Liana
176.	<i>Ruellia simplex</i> C.Wright	ACANTHACEAE	D	Herb
177.	<i>Sabal minor</i> Pers.	ARECACEAE	M	Shrub
178.	<i>Sabal palmetto</i> (Walter) Lodd. exSchult et Schult.f.	ARECACEAE	M	Tree
179.	<i>Nauclea latifolia</i> Sm.	RUBIACEAE	D	Shrub
180.	<i>Sclerocaryabirrea</i> (A. Rich) Hochst.	ANACARDIACEAE	D	Tree
181.	<i>Scopariadulcis</i> L.	PLANTAGINACEAE	D	Herb
182.	<i>Securidacalongipedunculata</i> Fres.	POLYGALACEAE	D	Tree
183.	<i>Senegaliaataxantha</i> DC.	FABACEAE	D	Tree
184.	<i>Senegaliameillifera</i> (Vahl) L.A.Silva & J.Freitas	FABACEAE	D	Tree
185.	<i>Senegaliasenegal</i> (L.) Britton	FABACEAE	D	Tree
186.	<i>Senna occidentalis</i> L.	FABACEAE	D	Shrub
187.	<i>Senna tora</i> L.	FABACEAE	D	Under shrub
188.	<i>Sesbania rostrata</i> Bremek et Oberm	FABACEAE	D	Shrub
189.	<i>Sida rhombifolia</i> L.	MALVACEAE	D	Shrub
190.	<i>Solanum seaforthianum</i> Andrews	SOLANACEAE	D	Liana
191.	<i>Pseudophoenixekmanii</i> Burret	ARECACEAE	M	Tree
192.	<i>Spondias dulcis</i> Sol. Ex Parkinson	ANACARDIACEAE	D	Tree
193.	<i>Spondias dulcis</i> L.	ANACARDIACEAE	D	Tree
194.	<i>Stevia rebaudiana</i> (Bertoni)	ASTERACEAE	D	Shrub
195.	<i>Strophantus sarmentosus</i> DC.	APOCYNACEAE	D	Shrub
196.	<i>Syagrusromanzoffiana</i> (Cham.) Glassman	ARECACEAE	M	Tree
197.	<i>Talinumpaniculatum</i> (Jacq.) Gaertn.	TALINACEAE	D	Herb
198.	<i>Tamarindusindica</i> L.	FABACEAE	D	Tree
199.	<i>Tamarix senegalensis</i> DC.	TAMARICACEAE	D	Shrub
200.	<i>Tapinanthusbangwensis</i> (Engl et Krause)	LORANTHACEAE	D	Shrub
201.	<i>Tetrapleuratetraptera</i> (schumach.et Thom)	FABACEAE	D	Tree
202.	<i>Trema guineensis</i> (schumach.et Thom)	CANNABACEAE	D	Tree

203.	<i>Tridaxprocumbens L.</i>	ASTERACEAE	D	Herb
N°	SPECIES NAME	FAMILY	CLASS	BIOLOGICAL TYPE
204.	<i>Turnera diffusa Willd. exSchult.</i>	PASSIFLORACEAE	D	Shrub
205.	<i>Typha domingensis Pers.</i>	TYPHACEAE	M	Herb
206.	<i>Vachellia nilotica var adansonii (L.)</i>	FABACEAE	D	Tree
207.	<i>Vachellia nilotica var tomentosa (L.)</i>	FABACEAE	D	Tree
208.	<i>Vachellia seberiana (DC.) Kyal. &Boatwr.</i>	FABACEAE	D	Tree
209.	<i>Vachellia seyal (Delile) P.J.H.Hurter</i>	FABACEAE	D	Tree
210.	<i>Vachellia tortilis (Forssk.) Hayne</i>	FABACEAE	D	Tree
211.	<i>Baccharoidesadoensis (Sch.Bip. ex Walp.) H.Rob.</i>	ASTERACEAE	D	Herb
212.	<i>Waltheriaindica L.</i>	MALVACEAE	D	Herb
213.	<i>WodyetiabifurcataA.K.Irvine.</i>	ARECACEAE	M	Tree
214.	<i>Yucca aloifolia L.</i>	ASPARAGACEAE	M	Tree
215.	<i>Yucca gigantea Lem.</i>	ASPARAGACEAE	M	Shrub
216.	<i>Yucca gloriosa L.</i>	ASPARAGACEAE	M	Shrub
217.	<i>Ziziphus jujuba Mill.</i>	RHAMNACEAE	D	Shrub
218.	<i>Ziziphus mauritianaLam.</i>	RHAMNACEAE	D	Tree
219.	<i>Ziziphus mucronataWilld.</i>	RHAMNACEAE	D	Tree
220.	<i>Ziziphus spina-christi (L.) Desf.</i>	RHAMNACEAE	D	Shrub

The systematics spectrum of the different taxa sampled in the study region shows the predominance of Fabaceae (34 species, i.e. 58.62%), Arecaceae (18 species, i.e. 31.03%), Apocynaceae, Euphorbiaceae, Poaceae (9 species, i.e. 15.52%), Asteraceae, Asparagaceae (8 species, i.e. 13.79%), Malvaceae, Combretaceae, Capparaceae (7 species, i.e. 12.06%) and Moraceae (6 species, i.e. 10.34%) (Table 1). The other families are represented with a number of species ranging from 1 to 5 (Fig. 2). The total number of species in the garden is 220 species, with 167 genera and 58 families. Analysis of this flora also shows that the Fabaceae family is the most represented in the environment. In another study of the spontaneous flora of O.V. Fomin Botanical Garden of Taras Shevchenko National University, Kyiv, Shynder et al., 2022 [24] have determined that Poaceae largely dominates the garden. This strong presence of Fabaceae could be explained by their ability to fix atmospheric nitrogen and their high seed production, which can remain viable for a very long time in the soil.

In the same region, Ndiaye (2012) recorded more than 324 species in 243 genera and 81 families, and noted a simple regression, probably due to human activities and land predation [17]. However, our results are superior to those of the flora of the Michel Adanson botanical conservatory in Mbour, which comprises 184 species in 146 genera and 54 families.

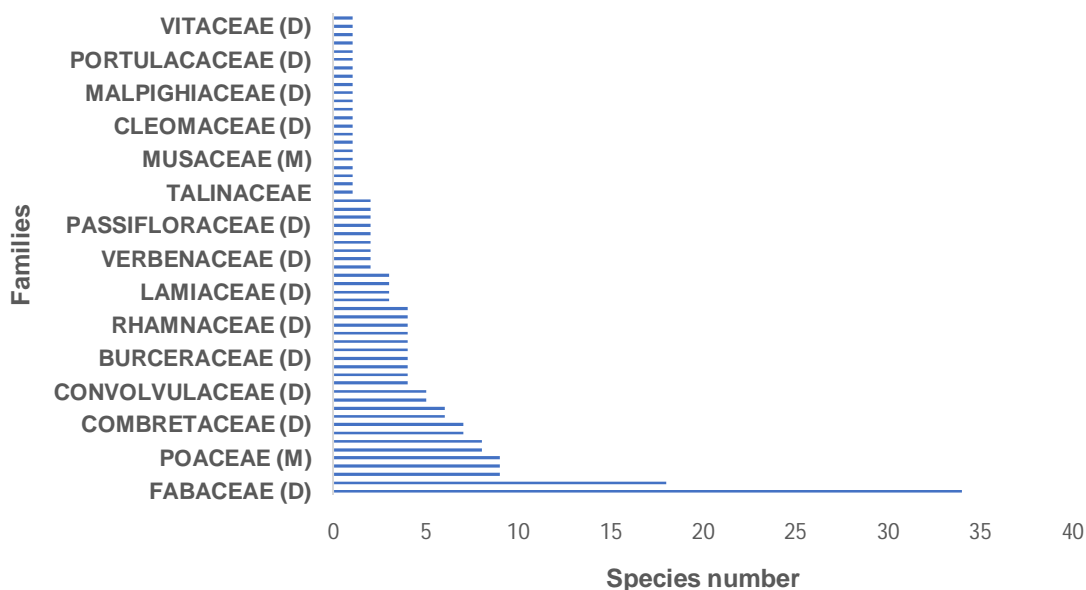


Fig.2. Systematic spectrum of the various taxa sampled.

In the garden, certain species are poorly represented or even very seldom; this is the case of the commelinaceae, cyperaceae and musaceae (Fig. 2). Great care must therefore be taken with these monospecific families, because if the corresponding species disappears, the family disappears from the flora. This distribution of families is greater than that of the JEPU flora [18], where legumes dominate with 14.87%, followed by Euphorbiaceae (8.43%) in 8 genera.

3.2. DISTRIBUTION OF SPECIES BY CLASS

Families belonging to the dicotyledonous class accounted for 81.03%, with the remaining 18.96% belonging to the monocotyledonous class (Table 2). In terms of genera, the dicotyledonous class represented 79.50%. In terms of diversity at the specific level, dicotyledons represent 80.45%. The results of the floristic inventories of the botanical garden of the Faculty of Science and Technology (FST, UCAD) showed that the garden is rich in 245 species divided into 190 genera and 71 families. Dicotyledons account for the majority of species (82.4%), genera (81.6%) and families (78.9%). These results are in accordance with our inventory [19].

This analysis shows that the Sahelian zone of the JBN has a high level of specific diversity. This remarkable diversity within families is due not only to the fact that the garden is well maintained, but also to the fact that there has been a strong drive to introduce species since 2003. What's more, the species come from almost all over the world, as in the case of the *Argania Spinosa* from Morocco. The strong presence of species with a wide geographical distribution shows the importance of the Botanical Gardens in their ability to restore ecosystems degraded by their research activities prior to introduction [20]. Table II shows distribution of species by class. In the twenty-first century, gardens will be essential to solving challenges like climate change, food security, biodiversity protection, environmental education, sustainability, and human well-being. Gardens will be required to address problems that go beyond the

garden's boundaries to achieve these extended mission areas by making social and environmental responsibility important institutional purpose drives [21]. Approaching the contributions of the world-wide sector of scientific institutions to addressing the extinction crisis, botanical gardens and their role in plant conservation bring together a diversity of perspectives [22]. According to Heywood VH, 2017 [23] biodiversity will inevitably continue to be lost, despite all our conservation actions and that we must focus on what to save, why and where. It has also been suggested that we need a new approach to conservation in the face of the challenges posed by the Anthropocene biosphere which we now inhabit. Table 2 shows distribution of species by class.

Table 2. Distribution of species by class

Class	Families		Genera		Species	
	Number	%	Number	%	Number	%
Dicotyledons	47	81,03	128	79,50	177	80,45
Monocotyledons	11	18,96	33	20,50	43	19,55

The Fig.3 shows distribution of species by class

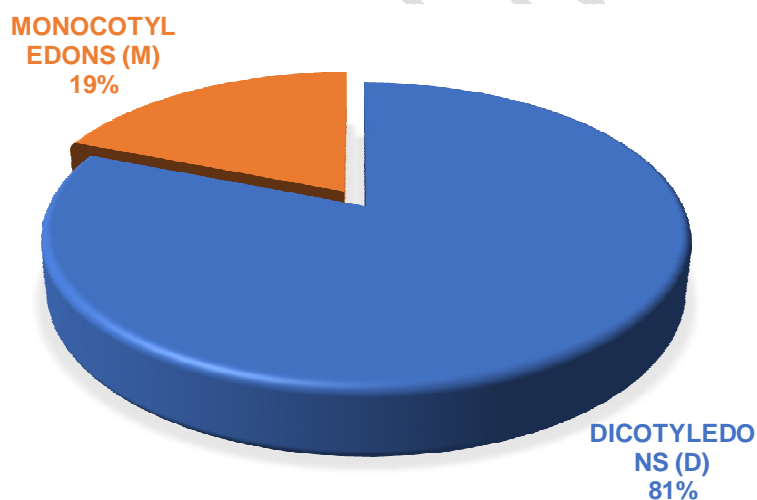


Fig. 3. Distribution of species by class

4. CONCLUSION

Floristic diversity was assessed at the Ngoltongobotanical garden in order to understand the current state and develop effective management strategies for the conservation of plant species. Various sampling techniques and measurement methods are used depending on the objectives of the studies, and in the

majority of studies, the size of the garden, money and manpower are the main constraints.

The inventory of the Ngoltongo Botanical garden shows a relatively diverse flora with 220 species in 161 genera and 58 families. The Ngoltongo Botanical Garden appears to be a site of high biodiversity due to the diversity of species planted in a relatively large area. It is therefore important for the success of its conservation, education and scientific research missions to consider: setting up a register to monitor species from their introduction to their disappearance, drawing up a seminum index, ethnobotanical studies of the site to find out which species are threatened in the area and consider transplanting them for ex-situ conservation, the phyto-sociological and phenological study of the site, the construction of a seedbed to enable exchanges with other botanic gardens.

5. DISCLAIMER (ARTIFICIAL INTELLIGENCE)

Author(s) hereby declare that NO generative AI technologies such as Large Language Models (ChatGPT, COPILOT, etc) and text-to-image generators have been used during writing or editing of this manuscript.

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