ORNAMENTAL PLANTS OF ANAMBRA STATE

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ABSTRACT

The scientific study of ornamental plants of Anambra State was carried on between April and September, 2019. The aim of the study was to identify the ornamental plants of Anambra State, the dominant growth forms involved, and the plant parts that give the principal (key) Aesthetic appeal. Two hundred and fifty questionnaires were distributed among staff and students residing in the major towns of the state-Awka, Onitsha, Nnewi and Ekwulobia covering the three senatorial zones of the State. The questionnaire was face-validated by the departmental team of lecturers and 218 were recovered! Reliability was established using Test – retest method. The questionnaire sought information on the Growth forms of ornamentals of Anambra State, their principal attractive features and even the little known ornamental plants that hold sway in the wild. At the end of the study, sixty-one (61) ornamental plants were identified: 17 trees, 35 shrubs, 4 grasses, 4 forbs and 1 climber. The key attractive features were identified as follows: flowers (13); entire plant (31); and leaves (17). Descriptive statistics (Bar charts, pie charts) were used to Represent Growth forms and principal attractive features, while inferential statistics (test for skewness) was used to establish whether variations in Growth forms and key attractive features were positive or negative. Results were also reflected in percentages for easier appreciation. There are many ornamental plants in Anambra State, many more are being introduced, but this study helped to identify outstanding wild ornamentals that could be incorporated into the mainstream (7 trees, 2 shrubs, 2 climbers, 2 grasses and 1 forb). The major threat to ornamentals in Anambra State is the unremitting decimation of trees generally by man that is causing extinctions. Ornamental forbs, shrubs, grasses and climbers were not exactly under threat because they are grown in watersheds, have high commercial appeal and can be accommodated within and without dwelling/working places without any qualms.

Keywords: Ornamental plants, aesthetic appeal, growth forms, descriptive statistics, wild ornamentals.

1. INTRODUCTION

The age old interrelationship between plants and mankind has been sacrosanct and mutually indispensable. Plants have faithfully sustained humanity from time immemorial in the following areas: food, shelter, clothing, industrial raw materials, medicines, phytochemistry, drinks, fodder, ornamentals, agri-horticulture, plant and animal habitats, fuel-wood, lubricants, illuminants, poisons, dyes, stimulants, gums, resins, pulp and paper, alcoholic and nonalcoholic beverages, religious, cultural, social and ethical purposes amongst other uses. Central to this study are ornamental plants and key to their attraction are flowers. Gill (1988), 'defines' a flower as a modified shoot, meant essentially for the reproduction of the plant. A typical flower is composed of four sets of appendages namely sepals, petals (perianth together), stamens and pistils. Petals are the second whorl of the floral parts, usually coloured and occupy a position in the flower between the sepals and stamens. Sepals are the outermost part of a flower and may be

placed either below or above the ovary. They are arranged in a whorl and together make up the calyx. The calyx is usually green, but occasionally it is petaloid". This implies coloration. Attractive coloration is a principal feature of plants that imbue in them, that ornamental appeal that have bequeathed them unquestionable universal allure. Apart from flowers; leaf characteristics, stem attributes, bark characteristics, shape, height, shoot configuration all contribute to a plant's ornamental appeal. Ornamental plants could be trees, shrubs, climbers (vines), grasses, forbs, *et cetera*.

The 'war against vegetation' (Greenery) that has been ravaging Anambra State since after the Nigeria Civil War did not spare any green plant –including ornamentals. The saving grace though for ornamental plants is that they have commercial relevance and could be sustained in existing watersheds. In a highly commercialized and industrialized state like Anambra, the focus is on markets, fuel and gas dispensing stations, motor parks, shopping malls, industries, factories, government offices, residential conglomerates and built-up conurbations. Vegetation in the state is very often abused, neglected and unceremoniously uprooted to make way for concretized structures. These plants can best be raised and protected in forest reserves, wilderness areas, botanical gardens and herbaria which are few and far between. Natural ornamentals as opposed to synthetic alternatives have multifarious amenity and ethical relevance and are needed in our residential areas, schools, hospitals, industries, hotels, recreational facilities and even on our highways, sidewalks and roads/streets to give pep, appeal and relief to our highly regimented disease prone modern existence. Tree ornamentals are the hardest hit and there are so many wild varieties that ought to be domesticated to boost species diversity in this respect. Prudence must be shown in the management of all living species and natural resources, in accordance with the precepts of sustainable development. Only in this way can the immeasurable riches provided to us by nature be preserved and passed on to our descendants. The current unsustainable patterns of production and consumption must be changed in the interest of our future welfare and that of our descendants (Paragraph 6, United Nations Millennium Declaration Paper, 2002).

Basically the principal relevance of ornamental plants is primarily their aesthetic appeal radiating from one or a combination of unique features and attributes-domiciled in any or several of their constituent organs, tissues or structures. Secondarily, taking away carbon iv oxide and given us oxygen; they (filter) deleterious influences/pollutants/noise from our living areas; they remedy polluted and restore contaminated sites; they shelter and feed man, his wild and domesticated animal species; they increase property values; save us energy costs by shielding us from excess solar radiation and cold waves; they shade us directly from solar radiation and wind effect; they promote infiltration, and protect us from erosion, flooding, desertification and deforestation; they alleviate the misery of stress, emotional, mental,

psychological and physiological diseases. Indeed there is no alternative to plants. Even synthetic prototypes are a far cry from their natural 'blueprints'. Many contain pharmacologically active secondary metabolites and are veritable sources of industrial raw materials. Millions of people enjoy hunting, fishing, camping, hiking, wildlife watching, and other nature-based activities. These activities provide invigorating physical exercise, and contact with nature can be psychologically and emotionally restorative. In many cultures, nature carries spiritual connotations, and is particular species of landscape may be inextricably linked to a sense of identify and meaning. Observing and protecting nature has religious or moral significance for many people. Some religious organizations call for the protection of nature simply because it is God's creation (Cunningham and Cunningham, 2006).

This study is aimed at identification, classification of ornamental plants of Anambra State and ascertaining their economic importance.

2. LITERATURE REVIEW

Ornamental plants are plants that are grown for decorative purposes in gardens and landscapes design projects, as houseplants, cut flowers and specimen display. The cultivation of ornamental plants is called Horticulture, which forms a major branch of horticulture (Wikipedia 2020).

It is observed from Gill (1988), that many plant families are associated with unique ornamental plants: Nymphaceaceae *(Nymphae lotus);* Ranunculaceae (Clementis, Ranunalus and Delphinium); Papaveraceae *(the* taxa: Eschscholtzia, Meconopis), Urticaceae (Pilea, Debregeasia); Chenopodiaceae (Atriplex and Kochia); Amaranthaceae (Alternanthera, Gomphrena, Aerva, Celosia); Nyctaginaceae (Bougainvillea, Mirabilis); Portulacaceae (Portulaca, Clatonia, Lewisia); Polygonaceae (Antigonon, Coccolobo, Polygonum); Malvaceae (Althea, Hibiscus, Malva, Pavonia and Thespesia); Sterculiaceae (Dombeya, Penterpetes); Cucurbitaceae (Melothria, Sicana, Sicyos); Brassicaceae (Iberis, Hesperis, Lunaria, Nasturtium); Rosaceae (Rosa, Potentilla, Spiroea); Combretaceae (Combretum, Quisqualis); Lythraceae (Lawsonia, Lagerstromia, Lythrum); Myrtaceae (Myrtus, Eucalptus, Callisteman); Euphorbiaceae (Codiaeum, Acalypha, Jatropha, Euphorbia); Sapindaceae (Sapindus, Koelreuteria, Dondonae, Xanthocerus); Umbelliferae (Eryngium, Angelica, Trachymne); Apocynaceae (Allamanda, Alstonia, Nerium, Plumeria, Tabermontana Thevetia, Vinca); Asclepiadaceae *(I. palmata, I. purpurea, I. quamoclit, convolvulus, I. ponicus);* (Hoya, Stapelia, Asclepias, Cryptostegia); Solanaceae (Petunia, Ehretia, Myosotis); Verbenaceae (Clerondendron, Duranta, Lantana, Verbena); Lamiateae (Ajuga, Coleus, Dracocephalum, Lavendula, Lmium, Melissa, Metha, Stachys); Scrophulariaceae (Russelia, Veronica, Linaria, Anthirrhinum, Digitalis); Bignoniaceae (Bignonia, Tecoma, Kigelia, Jacaranda); Acanthaceae (Thunbergia, Eranthemum, Barteria, Justicia); Rubiaceae (Hamelia, Ixora, Mussaenda, Gardenia); Asteraceae (Aster, Chrysanthemum, Dahlia, Calendula, Zinnia,

Tagetes, Helianthus, Tithonia); Zingiberaceae (Amomum, Kaempferia, Hedychium); Arecaceae (Phoenic, Roystonea); Araceae (Arum, Amorphophallus, (Ladium, Dieffenbachia, Philodendron, Pothos); Liliaceae (Aloe, Asparagus, Crinum, Gloriosa, Haemanthus, Hippeastrum, Hemerocalis, Lilium, Ruscus); Orchidaceae (Cautleya, Dendrotium, Epidendrum, Cymbidiium, Hebenaria, Bletilla). Flowers are the major attractants of most ornamental plants.

According to Uno *et.al*. (2001), flowers are of great economic importance. Many people spend hundreds of hours each year tendering flowering plants in their gardens, and thousands of dollars to raise roses, chrysanthemums, tulips, and hundreds of landscape and indoor plants. Flowers are often brightly coloured, sweet smelling, and oddly shaped. These attractants draw other animals to flowers too, which is essential for the sexual reproduction and seed production of many flowering plants. Many of the adaptations among flowers involve specializations for certain animals that pollinate them by transferring pollen from other flowers. This means that features such as the colors and odors of flowers and number of seeds in a fruit are functionally important. Flowering plants live in almost all terrestrial and aquatic habitats on earth. The business of growing and selling ornamental potted plants, flowers, fruits and seeds is called floriculture. In the Netherlands, known for growing and exporting tulips, floriculture is a $4-billion dollar industry and makes up 20% of the total agricultural productivity of the country. In the United States, in 1999, the total production of cut flowers such as roses sold at florist shops, potted flowering plants, bedding plants for gardens, turf grasses for lawns, and other greenhouse and nursery plants, totaled more than $8billion dollars. Production of perfumes and scented lotions and shampoos, mixtures that depend on natural and artificial fragrances, contribute to a multibillion-dollar industry in the United States. Fragrances from natural perfumes come mainly from oils of flowers, which are extracted through a process called steam distillation. Burkill (1985), listed the following families as containing the bulk of our ornamental plants: Acanthaceae, Agavaceae, Amaranthaceae, Amaryllidaceae, Anacardiaceae, Annonaceae, Apocynaceae, Araceae, Araliaceae, Araucariaceae, Aristolochiaceae, Asclepiadaceae, Balsaminaceae, Begoniaceae, Bignoniaceae, Bixaceae, Boraginaceae, Burseraceae, Cactaceae, Cannaceae, Capparaceae, Caprifoliaceae, Casuarinaceae, Chrysobalanaceae, Combretaceae, Commelinaceae, Compositae, Connaraceae, Convolvulaceae, Costaceae, Crassulaceae, Cucurbutaceae, Cyperaceae, and Bignoniaceae. Vanishing species- Natural Environments most in danger include tropical forests, wetlands and coral reefs. Some experts warn that by the year 2050 half the species alive today could have vanished unless action is taken quickly. The loss of a single plant species is a tragedy because with each plant, as many as 30 species of animals may also face extinction, depending as they do on that plant for food or shelter. Each specie is a storehouse of genetic resources. (Taylor, 2002).

3. METHODOLOGY

3.1. Description of the Study Area

Anambra State lies in South East Nigeria and was created in 1991. The State is made up of about 181 communities distributed in three senatorial zones of Central, North and South. The bulk of the more familiar ornamentals are found in the more developed areas like Awka, Onitsha, Nnewi, Ekwulobia, the universities, public institutions, government parastatals, churches, schools etc. In these areas, commercial hordes of these ornamentals are encountered along water courses because of the presence of water and their high demand. Wild ornamentals are often encountered in bushes outside the metropolitan areas.

Anambra State lies in the tropical rain forest zone of Nigeria, although most parts have fallen into Southern Guinea Savannah vegetation as a result of erosion, deforestation, paucity of fertile agricultural lands, grazing pressure and infrastructural development. Rainfall is preponderant from March to October yearly. Soil characteristics depend on the area- it ranges from laterite to clay, sandy and other mixes. The people of Anambra are mainly entrepreneurs, civil servants, artisans, farmers and business men and women.

3.2. Methods of Study

The research design utilized in this work was the descriptive survey design. Well-structured questionnaire were used to obtain field data from some staff and students of Anambra State. Fifty questionnaires were distributed to staff/students representing these areas; fifty were distributed randomly at Uli/Igbariam campuses of COOU. At the end of the day, two hundred and eighteen (218) were recovered for analysis. Selection of respondents was randomized to ensure sound statistics and complete elimination of bias. The instrument for data collection was a well- structured questionnaire which has been mentioned already. Each area had fifty questionnaires administered to them. The instrument was face-validated by the Departmental team of lecturers, who looked out for clarity of instructions, consistency in structure and organization. The reliability of instruments was ascertained using the test-retest method by the repetition of the same questions on the same group of respondents after an interval of two weeks.

Respondents were instructed to tick Yes or No in some instances and in a few other instances requested to give information based on ethno botanical knowledge. Positive responses or ticks from field data were pooled in percentages, captured in Bar charts; pie charts and interpreted using test for skewness. Interpretations and conclusions were subsequently drawn.

4. RESULTS

200 respondents mentioned at least fifty (50) of the highlighted ornamentals as being in existence in Anambra State. The remaining 11 were made up from the submissions of the remaining 18 respondents.

A total of 75 Ornamental plants were identified in Anambra State,61 were major ornamentals,14 were lesser known species(Tables 1a and 1b).Most Ornamental plants of Anambra State were woody perennial species; these were dominated by shrubs, followed by trees; grasses/forbs and climbers in that order(Tables 2a,2c and Fig.1).The plant families that dominated the ornamental species of Anambra State include: Fabaceae(10); Euphorbiaceae (7);Apocynaceae(6) and Poaceae(6) in that order (Table 1).

Table 1a: Checklist of Ornamental plants of Anambra State

S/N	Scientific Name	Common Name	Family	Principal attractive feature
1	*Polylthia longifolia*	Masquerade tree	Annonaceae	Entire plant (Height and leaves)
2	*Delonix regia (Boj.ex Hook) Rafin*	Flame of the forest	Fabaceae	Flowers
3	*Elaeis guineensis Jacq.*	Oil palm tree	Arecaceae	Leaves inflorescence
4	*Plumeria species alba, rubra*	Frangipani	Apocynaceae	Flowers multicoloured
5	*Terminalia catappa L.*	Indian almond	Combretaceae	Entire plant (Leaves)
6	*Terminalia ivorensis*	Black afara	Combretaceae	Leaves
7	*Cocos nucifera L.*	Coconut	Arecaceae	Entire plant
8	*Leucana leucocephala (Lam.)*	White land tree	Fabaceae	Entire plant (Feathery leaves/inflorescence)
9	*Tectona grandis L.F*	Teak	Verbenaceae	Entire plant (Unique inflorescence)
10	*Gmelina arborea Roxb*	Gmelina tree	Lamiaceae	Entire plant
11	*Senna siamea*	Cassia tree	Fabaceae	Entire plant (Flowers)
12	*Casuarina equisetifolia .L*	Whistling pine	Casuarinaceae	Needle leaves
13	*Eucalyptus officinarum*	Gum (Myrtle) tree	Myrtaceae	Entire plant (Fragrance/silvery bark)
14	*Thevetia neriifolia Juss*	Yellow oleander	Apocynaceae	Entire plant (Flowers/leaves)
15	*Caesalpinia pulcherrima (L.) Sm*	Pride of Barbados	Fabaceae	Flowers
16	*Tithornia diversifolia*	Tree marigold	Asteraceae	Flowers
17	*Jatropha gosipiifolium*	Wild cassava	Euphorbiaceae	Entire plant (Petaloid leaves)
18	*Allamanda cathartica L.*	Golden trumpet	Apocynaceae	Flowers
19	*Hibiscus rosasinensis L.*	China rose	Malvaceae	Flowers
20	*Duranta repens L.*	Yellow bush	Verbenaceae	Petaloid leaves
21	*Gardenia nitida Hook*	Glossy leaved gardenia	Rubiaceae	Entire plant (White flowers)
22	*Acalypha wilkesiana*	Red acalypha	Euphorbiaceae	Petaloid leaves
23	*Croton lobatus L.*	Lobed croton	Euphorbiaceae	Lanceolated petaloid leaves
24	*Ixora coccinea L.*	Ixora	Rubiaceae	Unique inflorescence (Flower)

Table 1a: Checklist of Ornamental plants of Anambra State (Continued)

S/N	Scientific Name	Common Name	Family	Principal attractive feature
25	*Bougainvillea glabtabilis*	Com. nov	Nyctaginaceae	Unique inflorescence (Flower)
26	*Chrysobalanus Icaco .L*	Cocoplum	Chrysobalanaceae	Entire plant (Leaves/fruits)
27	*Lantana camara L*	Yellow sage	Verbenaceae	Multi-coloured flowers/fragrance
28	*Alternanthara bettzickiana*	Baptist plant	Amaranthacease	Petaloid leaves
29	*Impatiens balsa mina .L*	Garden Balsam	Balsaminaceae	Entire plant (Flowers/Explosive inflorescence)
30	*Datura stramonium*	Onion jimson weed	Solanaceae	Entire plant
31	*Bryophyllum pinnatum (lam) person*	Resurrection plant	Crasulaceae	Entire plant (Leaves, flowers, succulent appearance)
32	*Catharanthus roseus (L.) G.Don*	Oldmaid	Apocynaceae	Entire plant (Flowers)
33	*Mussaenda species*	Tropical dogwood	Rubiaceae	Flowers
34	*Petunia oleracea*	Tobacco family	Solanaceae	Entire plant
35	*Thuja occidentalis*	Eastern white cedar	Cupressaceae	Unique leaves arrangement
36	*Breynia nivosa J.R and G. Frost*	Ice Plant	Euphorbiacease	Petaloid leaves (Variegated)
37	*Canna indica L. wild*	Cana lily	Cannaceae	Flowers
38	*Sansevieria trifasciata*	Viper's bowstring	Agavaceae	Leaves
39	*Artocarpus altilis (Parkinson) fosberg*	Breadfruit	Moraceae	Entire plant (Compound incredibly pattemed leaves)
40	*Acalypha hyspida Burm*	The chenille plant	Euphorbiaceae	Entire plant
41	*Dichrostachys cinerei*	Sickle bush	Fabaceae	Entire plant
42	*Klausinia anisata*	Horsewood	Fabaceae	Entire plant
43	*Codiaeum variegatum (L.) Blume*	Croton	Euphorbiaceae	Entire plant
44	*Dieffenbachia seguine schott*	Dumbcane	Araceae	Leaves
45	*Harunguna madagascariensis*	Haronga/Dragon's blood tree	Clusiaceae	Entire plant (Conspicuously flattened terminal flowerheads)
46	*Portulaca grandiflora Hortnon hooker*	Purselane	Portulaceaceae	Flower
47	*Strelitzia reginae Dryand*	Bird of paradise flower	Strelitziaceae	Entire plant
48	*Moringa oleifera*	Horseradish tree	Morinoaceae	Entire plant (White flowers)
49	*Azadiracta indica*	Neem tree	Meliaceae	Leaves

The entire plant (with all the attractive features of shape, leaf characteristics, stem characteristics, flower characteristics) accounted for the highest (50.8%) percentage in terms of ornamental appeal. The leaves alone accounted for 27.9%, while the flowers accounted for 21.3% (Tables 2a, 2c and Fig.2).

Additionally, these 75 ornamental plants possess other utilities apart from their aesthetic appeal. According to the respondents, these include erosion control (107.1"), habitat for other species (96.6"), sources of fuel wood (59.7"), medicinal plants (43.9"), industrial raw materials (24.5"), food value (15.8") and animal fodder species (12.3%).

Table 1: Checklist of ornamental plants of Anambra State (Continued)

50	*Tecoma stans*	Trumpet bush	Bignoniaceae	Entire plant (Flowers)
51	*Calotropis procera*	Sodom apple	Asclepiadaceae	Entire plant
52	*Syringa vulgaris*	Lilac	Oleaceae	Leaves
53	*Euphorbia millii*	Crown of thorns	Euphorbiaceae	Entire plant
54	*Hyphaene petersiana*	Fan palm	Arecaceae	Leaves
55	*Aspilia africana (Pers.) C.D. Adams*	Haemorrhage plant	Asteraceae	Flowers
56	*Senna hirsuta*	Stinking cassia	Fabaceae	Entire plant (Flowers and fruits)
57	*Paspalum scrobicultum (Linn.)*	Indica paspalum	Poaceae	Leaves
58	*Cymbopogon cittratus*	Lemon grass	Poaceae	Leaves
59	*Cynodon dactylon (L.) persoon*	Stargrass	Poaceae	Leaves
60	*Axonopus compressus (Sw.) palisot de Beavois*	Carpet grass	Poaceae	Leaves
61	*Holarrhena floribundo*	Holarrhena	Apocynaceae	Entire plant

Figure 1 shows that shrubs dominate ornamental plants of Anambra State, followed by trees grasses/forbs and climbers in that order. The skewness results also show that the degree of asymmetry of this distribution is 1.799, meaning that skewness is positive. Variation is therefore relatively significant

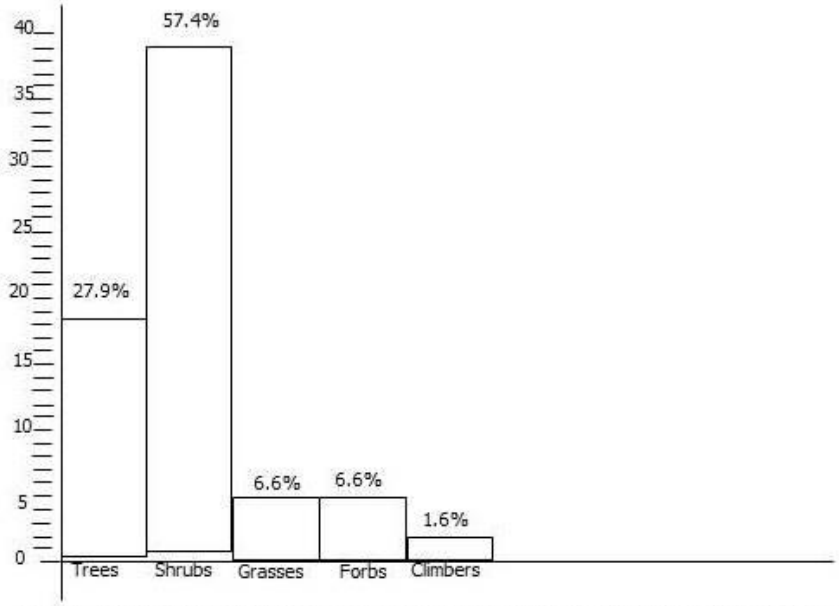

Fig 1. Bar Chart depicting Growth forms of Encountered Ornamentals.

Figure 2 shows that combined plant features has the highest percentage in terms of appeal, followed by leaves and then flowers.

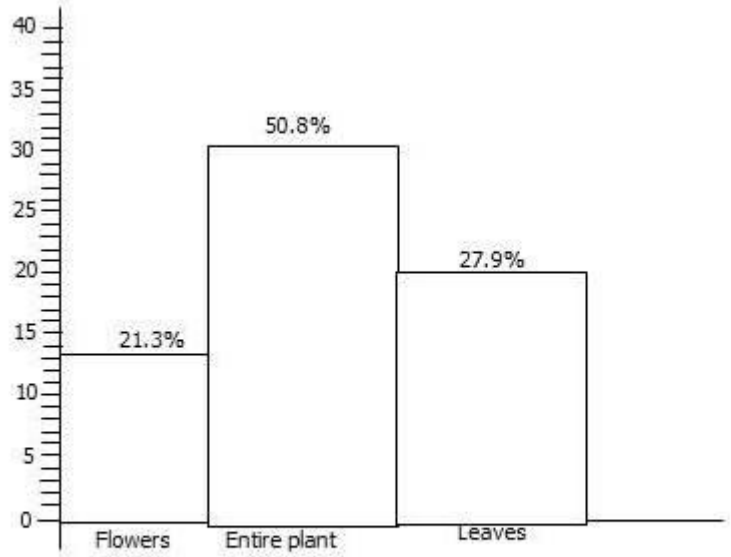

Fig. 2. Bar Chart depicting the principal attractive features of Encountered Ornamentals.

5. CONCLUSION

There are many ornamental plants in Anambra State and more are being introduced still. Their preponderant growth forms is shrub, followed by trees, forbs and grasses. It appears that a large-chunk of our shrub and forb ornamentals were introduced while reverse seems to be the case for their tree and grass counterparts. We do have several potential ornamentals trapped in the wild. Presently the *Delonix regia, Bougainvillia glabtabilis, Caesalpinia pulccherima, Bombax buonopozense* and to a lesser extent *Albizia adianthifolia* are simply breathtaking when in bloom.

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REFERENCES

Burkill, H.M. (1985). *The useful plants of West Tropical Africa*. Edition 2. Vol. 1 families A-D. Royal Botanic Gardens, Kew. U.K P.766.

Cunningham, W.P and Cunningham, M.A. (2006). *Principles of Environmental Science*. *Inquiry and Applications*. Third Edition. McGraw Hill Publishers, U.S.A. 428pp.

Gill, L.S. (1988). *Taxonomy of Flowering Plants.* Africana. Fep Publishers Limited, Onitsha, Nigeria. 338pp.

Taylor, S. (2002). *The Grolier Science Encyclopedia Vol. 10 Conservation and the Environment. Vanishing Species*. Kingfisher Publications Plc. UK. 463p.

Uno, G; Storey, R. and Moore, R. (2001). *Principles of Botany*. The McGraw Hill Companies, Inc. New York. U.S.A. Pp. 272-295.

Wikipedia (2020). Ornamental plants *https://en.m.wikipedia.org.* U.S.A.

The United Nations (2003). Political Declaration and Plan of Implementation. *Paragraph 6, United Nations Millennium declarations (2020) Ornamental Plants*. World Summit on Sustainable development, Johannesburg (2002).