

# A Survey of the Most Common Ornamental Plants in Southwest Nigeria

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## ABSTRACT

This study surveyed the most common ornamental plants (OPs) in Southwestern Nigeria with the aim of establishing the ratio of exotic to native population. Thirteen ornamental gardens were purposively selected on availability and accessibility, in Lagos, Ibadan. and Ile-Ife. Most common OPs were determined using Du Rietz frequency class ranges (f=61-100%). Fifty-one species belonging to 28 families comprised most common OPs. The percentage frequency of exotic to native OPs was 94.1 to 5.9 (16:1). Of the 94.1% exotic OPs, a large number were natives to Asia (39.2%) and South America region (35.3%).

(Keywords: ornamental gardens, ornamental plants, exotic species, native species, Southwest Nigeria)

## INTRODUCTION

In Nigeria, ornamental gardening is becoming popular, especially in large urban cities as evidenced by the proliferation of these gardens in street corners and along major roads (Olorode, 2004). Ornamental gardening has become a lucrative business venture practiced by many as a source of livelihood especially in the southern parts of the country particularly Lagos, Ibadan, and Ilorin (Jesse *et al.*, 2002).

A majority of the plants found in these gardens are exotic, with only few indigenous species (Ochekwu *et al.*, 2011; Ma, 2014). Regrettably, the majority of owners of garden units, although they may have vast knowledge of these species and of the factors affecting the plants, they are often completely ignorant of the possible implications of their impacts on the ecosystem (Brocks, 1999). Being driven largely by profit and increasing aesthetic valuation, owners of garden units are constantly searching for uncommon

species that will appeal to the public (Jayeola, 2008). By so doing, they act as the main inlets for exotic ornamentals in Nigeria through unregulated sales to the general public. This has resulted in the introduction of plants which have subsequently established themselves as weeds or invasive alien species (IAS) (Wilson (1992).

IAS have become established in places they were introduced as they rapidly colonize areas, altering community composition and even displacing native species, impacting negatively on biodiversity (Jayeola, 2008). Furthermore, the influx of exotic species has led to poor development or gross neglect of indigenous ornamental species, since indigenous plants are often undervalued in favor of exotic and alien species (Shushu *et al.*, 2009). The use of native plants provide abundant habitat for native birds, butterflies and other animals, thereby creating an oasis of biodiversity (Fodor, 2015). Therefore, integrating native plants into the landscapes can help to restore native flora and fauna which are already being threatened with extinction (Fodor, 2015).

This study was conducted to survey the diversity of ornamental plants grown in three cities in Southwestern Nigeria with objective of determining native and exotic ornamental plants among the most common species in the study area

## MATERIALS AND METHODS

This research was conducted in Ibadan, Lagos metropolis and Ile-Ife all in Southwestern Nigeria. A total of 13 ornamental gardens were used for this study, comprising nine private-owned and four Government-owned gardens covering the study locations.

## **Plant Identification**

Plants were identified with the assistance of the garden owners and curators in the institution-based gardens. Those that were not identified on-site were taken to, or had their pictures sent on-line, to the Herbarium located in the Department of Botany, Obafemi Awolowo University, Ile-Ife, Osun state, Nigeria. Additional taxonomic keys and materials used for plant identification include published materials by Akobundu and Agyakwa (1998) and (Ndiribe and Illoh, 2001). Others were online sources such as, Royal Botanical Garden of Edinburgh (RBGE), Catalogue of Life, National Plant Germplasm System (NPGS), Daves Garden, Encyclopedia Britannica, National Tropical Botanical Gardens (NTBG) and Wellgrow Horticulture Trading.

## **Data Analysis**

A Table listing all ornamental plants present in all the study sites was prepared. Plants in each of the gardens were tabulated as present or absent (+/-) in each of the gardens, to give the occurrence of each species across the thirteen gardens studied. Percentage frequency of species was calculated (Faurie *et al.*, 2001; Fakayode *et al.*, 2008). Frequency classes were established using the range proposed by Du Rietz (1926) and to establish the most common ornamental plants. A plant was considered common if it was present in at least 61% or eight of thirteen gardens studied (Du Rietz, 1926). Percentage frequency of each plant species  $F(x)$  was calculated using the formula:

$$\% F(x) = n/N \times 100 \quad (1)$$

Where,  $n$  = number of Gardens in which a particular plant species occurred

$N$  = total number of Gardens sampled

## **RESULTS AND DISCUSSION**

The results presented in Table 1 are a summary of the composition of the most commonly grown or popular ornamental plants across the gardens studied, their families, region of origin, common names, as well as their percentage frequency. A total of 51 plant species belonging to 28 families occurred in at least 61% of the gardens studied. Among these, the family Araceae had the highest

number of species (eight species), followed by the family Arecaceae (five species).

Asparagaceae and Euphorbiaceae had four species each whereas, the families Moraceae and Rubiaceae had three species each. The remaining families had less than three species each. Furthermore, the 51 popular species encountered in the study were composed thus: six species occurred in all 13 gardens sampled, thus recording a 100% occurrence. These were *Bougainvillea* sp., *Dracaena fragans*, *Cycas revoluta*, *Euphorbia milii*, *Ficus benjamina* and *Thuja occidentalis*. Six species were also present in 12 Gardens that is, 92% frequency. These included: *Terminalia mantaly*, *Acalypha wilkesiana*, *Codiaeum variegatum*, *Dieffenbachia seguine*, *Duranta erecta* and *Ixora coccinea*. Ten species were present in 11 (85%) of the gardens. These were *Epipremnum aureum*, *Hibiscus rosasinensis*, *Tradescantia spathaceae*, *Murraya paniculata*, *Licuala* sp., *Aglaonema commutatum*, *Polyalthia longifolia*, *Dypsis lutescens*, *Cordyline fruticosa* and *Caryota* sp.

Six species namely *Anthurium andraeanum*, *Archontophoenix alexandrae*, *Ficus microcarpa*, *Terminalia catappa*, *Cuphea hyssopifolia* and *Heliconia psittacorum* occurred in 10 (77%) of the gardens. Nine species were present in nine of 13 gardens (69%) and these were *Cheilocostus speciosus*, *Dieffenbachia maculata*, *Hamelia patens*, *Polyscias balfouriana*, *Syngonium podophyllum*, *Araucaria heterophylla*, *Mussaenda philippica*, *Plumeria rubra* and *Ravenala madagascariensis*. Lastly, 14 species were present in eight (62%) of the gardens studied. These were: *Chlorophytum comosum*, *Dracaena surculosa*, *Allamanda cathartica*, *Ficus elastica*, *Jatropha integerrima*, *Moringa oleifera*, *Opuntia* sp., *Philodendron atabapoense*, *Philodendron bipinnatifidum*, *Rosa* sp., *Roystonea regia*, *Bryophyllum pinnatum*, *Axonopus compressus* and *Turnera subulata*.

Among the 51 most common ornamental plants listed in this study, only three species were native to Western tropical Africa, with Nigeria listed among their country of origin. These include *Dracaena fragans* (Plate 1a) that occurred in all the 13 Gardens studied (that is, having 100% occurrence), *Dracaena surculosa* (Plate 1b) and *Chlorophytum comosum* (Plate 1c), both occurring in eight of the 13 gardens studied (62%).

**Table 1:** Names, Region of Origin, and Percentage Frequency of Most Common Ornamental Plants in Gardens Studied.

PLANT NAME	FAMILY	COMMON NAME	ORIGIN	REGION	GARDENS PRESENT	% FREQ.
<i>Bougainvillea sp.</i>	Nyctaginaceae	Four-O'Clock plant	Brazil (Kobayashi <i>et al.</i> , 2007)	South America	13	100
<i>Cycas revoluta</i> Thunb.	Cycadaceae	Sago Palm	Southern Japan (Huxley, 1992)	Asia	13	100
<i>Dracaena fragrans</i> (L.) Ker Gawl	Asparagaceae	Corn plant, Chinese money tree	Tropical Africa(south of Sudan to Mozambique, West to Cote d'Ivoire and southwest to Angola) (Wellgrow Horticulture Trading, 2016)	Africa	13	100
<i>Euphorbia millii</i> L.	Euphorbiaceae	Crown of thorns, Christ's thorn	Madagascar (Schoellhorn, 2001)	Africa	13	100
<i>Ficus benjamina</i> L.	Moraceae	Weeping Fig, waringing	South and Southeast Asia (India, Malaysia, China) Australia (National Tropical Botanical Garden) NTBG, 2016a	Asia	13	100
<i>Thuja occidentalis</i> L.	Cupressaceae	Arborvitaes, cedar, redcedars, White cedars	North America: Canada and Northern USA (National Plant Germplasm System) NPGS, 2016a	North America	13	100
<i>Acalypha wilkesiana</i> Müll. Arg	Euphorbiaceae	Acalypha	Fiji, East Indies, the pacific (NTBG, 2016b)	Australia	12	92
<i>Codiaeum variegatum</i> (L.) A. Juss	Euphorbiaceae	garden croton, variegated croton	Southern India, Sri Lanka, Indonesia, Malaysia, western Pacific Ocean Islands (Huxley, 1992).	Asia	12	92
<i>Dieffenbachia seguine</i> (Jacq.) Schott	Araceae	Dumb cane	Tropical Americas (Southern Mexico, Central America to northern South America & Brazil) (Govaerts and Frodin, 2002; Croat, 2004)	North and South America	12	92
<i>Duranta erecta</i> L.	Verbenaceae	pigeon berry, sky flower, golden dewdrop	Florida U.S.A. (Gilman, 1999) South America (Sanders, 2001)	North and South America	12	92
<i>Ixora coccinea</i> L.	Rubiaceae	Flame of the woods, Flame jungle,	Southern India, Sri Lanka (Riffle, 1998)	Asia	12	92
<i>Terminalia mantaly</i> H. Perrier	Combretaceae	Madagascar Almond	Madagascar (Orwa <i>et al.</i> , 2009)	Africa	12	92
<i>Aglaonema commutatum</i> Schott	Araceae	Chinese evergreen	Southeast Asia (Henry <i>et al.</i> , 2015)	Asia	11	85
<i>Caryota sp.</i>	Arecaceae	Fishtail palm	Asia (China, India, Indonesia, etc.), Northern Australia, and the South Pacific (Kew Royal Botanical Gardens, 2016a)	Asia	11	85
<i>Cordylone fruticosa</i> (L.) A. Chev	Asparagaceae	Cabbage Palm, Good Luck plant Palm Lily, Ti Plant, miracle plant, good-luck plant	Tropical Asia and Australia (NTBG, 2016c). South-eastern Asia, Papua New Guinea, Melanesia, Northeastern Australia, The Indian Ocean, parts of Polynesia (Hinkle, 2007).	Australia and Asia	11	85
<i>Dypsis lutescens</i> (H.Wendl.) Beentje & J.Dransf	Arecaceae	bamboo palm, golden cane palm, areca palm, butterfly palm	Madagascar (NPGS, 2016c)	Africa	11	85

PLANT NAME	FAMILY	COMMON NAME	ORIGIN	REGION	GARDENS PRESENT	% FREQ.
<i>Epipremnum aureum</i> (Linden & André) Bunting)	Araceae	Golden pothos, devils ivy	Australia, Asia (Indonesia, China, Japan and India) (GRIN, 2015).	Australia and Asia	11	85
<i>Hibiscus rosasinensis</i> L.	Malvaceae	Chinese hibiscus, China rose, Hawaiian hibiscus,	Southeast Asia (China) (Kumar and Singh, 2012).	Asia	11	85
<i>Licuala</i> sp.	Arecaceae	Ruffled Fan Palm, Palas Palm, Vanuatu Fan Palm	Southern China, Southeast Asia, The Himalayas, New Guinea, western Pacific Ocean islands (Heatubun and Barfod, 2008; Saw, 2012).	Asia	11	85
<i>Murraya paniculata</i> (L.) Jack	Rutaceae	Orange Jasmine, Mock lime, mock orange	Southern China, Taiwan, The Indian subcontinent (India, Nepal, North-eastern Pakistan and Sri Lanka), South-eastern Asia (i.e. Cambodia, Laos, Myanmar, Thailand, Vietnam, Indonesia, Malaysia and the Philippines and Northern Australia (Wiersema and Leon, 2013)	Asia	11	85
<i>Polyalthia longifolia</i> (Sonn.) Thwaites	Annonaceae	Masquerade tree, asoka tree	South India, Sri Lanka (NPGS, 2016b).	Asia	11	85
<i>Tradescantia spathacea</i> Sw.	Commelinaceae	Oyster plant, boat lily, Moses-in-the-cradle, Moses-in-a-boat, Men-in-a-boat	The New World tropics Canada to northern Argentina Belize, Mexico, Central America (The Centre for Agriculture and Bioscience International (CABI, 2016a)	North America	11	85
<i>Anthurium andraeanum</i> Linden	Araceae	Anthurium, tailflower, flamingo flower and laceleaf	The Americas (From Northern Mexico to Northern Argentina and parts of the Caribbean (Govaerts and Frodin, 2002).	South America	10	77
<i>Archontophoenix alexandrae</i> . (F. Muell.) H. Wendl. & Drude	Arecaceae	King palm, Alexander palm, Alexandra palm,	Queensland, Australia, (Jones 1995, Turner and Wasson, 1997)	Australia	10	77
<i>Cuphea hyssopifolia</i> Kunth.	Lythraceae	false heather, Mexican heather, Hawaiian heather, elfin herb	Mexico, Guatemala and Honduras (Germplasm Resource Information Network GRIN, 2011; USDA-ARS, 2015)	South America	10	77
<i>Ficus microcarpa</i> L.	Moraceae	Curtain fig, Chinese Banyan, Malayan Banyan, Taiwan Banyan Indian Laurel, Gajumaru	Sri Lanka to India, The Malay Archipelago, The Ryukyu Islands, Taiwan, Australia, New Caledonia (NTBG, 2016d)	Asia	10	77
<i>Heliconia psittacorum</i> L. f.	Heliconiaceae	lobster-claws, false bird-of-paradise	Tropical America (NTBG, 2016e)	South America	10	77
<i>Terminalia catappa</i> L.	Combretaceae	Indian almond, Malabar almond, Tropical almond.	India to The Pacific (Oudhia and Paull, 2008)	Australia and Asia	10	77

PLANT NAME	FAMILY	COMMON NAME	ORIGIN	REGION	GARDENS PRESENT	% FREQ.
<i>Cheilocostus speciosus</i> (J.Konig) C. Specht ( <i>Costus speciosus</i> (Koenig) Sm)	Costaceae	crêpe ginger, Malay ginger	southeast Asia (Floridata plant Encyclopedia, 2016)	Asia	9	69
<i>Dieffenbachia maculata</i>	Araceae	Dumb Cane, Tuft root	Brazil, West Indies (Encyclopedia Britannica, 2016a)	South America	9	69
<i>Hamelia patens</i> Jacq.	Rubiaceae	Firebush, Scarlet Bush	Tropical America South Florida, Bahamas, Caribbean, Central Mexico to Brazil, Argentina and Paraguay (Brown <i>et al.</i> , 2014)	South America	9	69
<i>Polyscias batfloriana</i> (Sander ex André) L.H. Bailey	Araliaceae	Balfour Aralia	New Caledonia. New Zealand, the Pacific Islands and tropical Asia, (Ilyas, <i>et al.</i> , 2013).	Australia and Asia	9	69
<i>Syngonium podophyllum</i> Schott	Araceae	Syngonium, Arrow head plant, Arrowhead philodendron, African evergreen	Southern Mexico Tropical rain forests, The West Indies, Central and South America. [Global Invasive Species Database (GISD), 2015]	South America	9	69
<i>Araucaria heterophylla</i> (Salisb.) Franco	Araucariaceae	Norfolk Island pine	Norfolk Island (Welch-Keesey and Bailey, 2006)	Australia	9	69
<i>Mussaenda philippica</i> A. Rich.	Rubiaceae	Tropical dogwood, Buddah's lamp, Pride of the Philippines,	The Philippines (NTBG, 2016f)	Asia	9	69
<i>Plumeria rubra</i> L.	Apocynaceae	Plumeria, frangipani, temple tree	Tropical America, Mexico, Central America, Colombia and Venezuela (Gilman and Watson, 2015)	South America	9	69
<i>Ravenola madagascariensis</i> Sonn	Strelitziaceae	Traveller's palm, Traveller's tree	Madagascar (Encyclopedia Britannica 2016c)	Africa	9	69
<i>Allamanda cathartica</i> L.	Apocynaceae	Golden trumpet, common trumpet vine, yellow allamanda	Tropical South America (Kew Royal Botanic Gardens, 2016b)	South America	8	62
<i>Axonopus compressus</i> (Swartz) P. Beauv	Poaceae	Carpet grass	Mexico, Central America, tropical South America and the West Indies (Lee Kong Chian Natural History Museum, 2016)	South America	8	62
<i>Bryophyllum pinnatum</i> (Lam.) Oken.	Crassulaceae	Air Plant, Life Plant, Miracle Leaf, Goethe Plant, Resurrection plant	Madagascar (Boiteau and Allorge-Boiteau , 1995; CABI, 2006)	Africa	8	62
<i>Chlorophytum comosum</i> (Thunb.) Jacques	Asparagaceae	spider plant, airplane plant hen-and-chickens	Tropical and southern Africa: Cote D'Ivoire, Liberia, Nigeria South Africa etc. (NPGS, 2016d)	Africa	8	62



PLANT NAME	FAMILY	COMMON NAME	ORIGIN	REGION	GARDENS PRESENT	% FREQ.
<i>Dracaena surculosa</i> Lindl.	Asparagaceae	Gold dust dracaena, Japanese Bamboo, spotted dracaena	Western tropical Africa Rainforest Region: Benin, Cote D'Ivoire, Ghana, Guinea, Liberia, Nigeria, Sierra Leone, Togo, West-Central Tropical Africa: Cameroon (NPGS, 2016e).	Africa	8	62
<i>Ficus elastica</i> Roxb. ex Hornem.	Moraceae	rubber fig, Indian rubber, bush rubber, rubber tree	Northeast India, Nepal, Bhutan, Burma, China (Yunnan), Malaysia, Indonesia (Wu <i>et al.</i> , 2013)	Asia	8	62
<i>Jatropha integerrima</i> . Jacq.	Euphorbiaceae	Peregrine, spicy jatropa	Cuba, Hispaniola the West Indies and South America (Gilman and Watson, 2015)	South America	8	62
<i>Moringa oleifera</i> Lam	Moringaceae	horseradish tree, drumstick tree, benzolive tree,	India, Pakistan, Bangladesh and Afghanistan (Fahey, 2005)	Asia	8	62
<i>Opuntia</i> sp.	Cactaceae	prickly pear, cactus pear	Mexico (Griffith, 2004)	South America	8	62
<i>Philodendron atabapoense</i> G.S.Bunting	Araceae	Philodendron	The Amazonia region of Brazil and the southern portion of Venezuela (Brian's Botanicals, 2016a).	South America	8	62
<i>Philodendron bipinnatifidum</i> Schott ex Endl.	Araceae	Lacy tree philodendron, selloum	South America - Brazil, Brazil, Argentina, Paraguay (Brian's Botanicals, 2016b).	South America	8	62
<i>Rosa</i> sp.	Rosaceae	Rose	Most are native to Asia, Few others from Europe, North America, Northwest Africa The Temperate regions of the Northern Hemisphere. (Encyclopedia Britannica, 2016b)	Asia Europe North America Africa	8	62
<i>Roystonea regia</i> (Kunth) O.F.Cook	Arecaceae	Cuban royal palm, Florida royal palm, royal palm	Florida, Mexico, Parts of Central America, The Caribbean (NTBG, 2016g)	North and South America	8	62
<i>Turnera subulata</i> J. E. Smith	Turnaraceae	White alder, Sulphur Alder	Northern and and Southern America (Reddy, 2008; NPGS, 2016f)	North and South America	8	62



a. *Dracaena fragans*



b. *Dracaena surculosa*



c. *Chlorophytum comosum*

**Plate 1 (a, b, c):** Most Common Native Ornamental Plants in Study Area.

Aside from these three, all the other forty-eight most common ornamental species encountered in this research were non-native (exotic) species. In all, the cumulative percentage frequency of the indigenous ornamental plants amongst the most popular ones grown in the study area was 5.9% compared to 94.1% exotic species. Of these 94.1% exotic ornamental plants, a large number Equally evident from the results obtained from the present study is the fact that a large number of plants grown as ornamentals in the areas studied are exotic, the majority coming from Asia.

## DISCUSSION

The prevalence of exotic species among commonly grown ornamental plants has been reported by FAO (1990) and Ochekwu et al. (2011). Compared to the large number of exotic ornamentals encountered in this and other studies, few other ornamental plants reported as indigenous were also identified in this study. This group of species recorded a percentage frequency ranging between 7.68% - 53.85%, a figure evidently small in relation to the exotics. They include *Thunbergia erecta* (GRIN, 2016), *Leea guineensis* (JSTOR, 2016), *Dracaena arborea* (Okonji, et al., 1996; McLaughlin, 2016), *Clerodendrum thomsoniae*, *Crinum jagus*, *Dracaena species* (such as *D. deremensis*, *D. reflexa*, *D. marginata*), *Ficus lyrata*, and *Oncoba spinosa* (McLaughlin, 2016).

It is important to note that some ornamental plants indigenous to Tropical West Africa listed by McLaughlin (2016) such as *Eugenia coronata*, *Newbouldia laevis*, *Tamarindus indica*, *Whitfieldia elongata*, *Strophanthus gratus*, and *Stereospermum kunthianum* and so on, were not encountered at all in this study, thus further confirming that native plants are generally neglected and often undervalued in favor of exotic and alien species (Shushu et al., 2009).

## CONCLUSION

The Nigerian floriculture industry promotes exotic ornamental plants to the neglect of native species which on its own poses serious threats to native biodiversity. Development and use of native species by the industry is therefore recommended.

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