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Full Length Research Paper

Woody Species for Urban Forestry in Lomé: A Case Study

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Many studies have been conducted on the flora of Togo. However, none of them is devoted to the ornamental flora horticulture. This survey aims to establish an inventory of the woody plant species in urban forests of Lomé, the capital town of Togo. It covers the trees planted along the avenues, in the gardens, courtyards, shady trees and trees used as fences for houses or trees at the seaside. In total, 297 plant species belong to 141 genera and 48 families were recorded. They are dominated by 79% of dicotyledonous, 13% of monocotyledonous and 8% of gymnosperms. Families that are best represented in terms of species are those of the Euphorbiaceae, Arecaceae and Acanthaceae. Alien species represent 69% and African species represent 31% out of which 6% are from Togo. According to the current threatening of the natural habitat by human activities, African native plant species could be more useful for ornamental purposes than exotic plants.

Key words: Ornamental horticulture, plant flora, green areas, valorisation, native flora.

INTRODUCTION

Urban forestry refers to trees and forests located in cities, including ornamental and grown trees, street and parkland trees, protected forests and green areas (Kuchelmeister, 2000). In European countries, urban forestry has mainly been developed for both aesthetic purposes and environmental benefits (Miller, 1997; Nilsson and Randrup, 1997). It therefore appears as a modern approach to conserve plants and forest stands with ornamental values in urban areas taking into account the long-term planning, as well as design and management (Nilsson and Randrup, 1996). All these functions led to the concept of "urban greening" or urban forestry (Miller, 1997).

Trees planted along the avenues in African capital cities, contribute to the plant diversity (IUCN, 1994). This also applies to the parks and green areas that provide a decent environment. The indirect benefits of an urban landscape covered with trees for the physical and mental health has been documented (Ulrich, 1984). It is demonstrated that plants have the capacity to absorb contaminants from the cities. They are thus called the lungs of cities (McPherson et al., 2005; Yang et al., 2005). They represent places of pastime, leisure, recreation and decoration necessary for human life. They contribute to the improvement of air quality, thus having a positive impact on health, with effects as obvious as the decrease in cases of respiratory diseases (McPherson, 2005).

In developed countries, several studies have been devoted to the study of trees in urban areas (Kuchelmeister and Braatz, 1993; Kuchelmeister, 2000). However, very little literature addresses the presence of trees in urban areas in Sub-Saharan Africa (SSA). Meanwhile, this knowledge of the urban flora is necessary to optimize the planning methods and the management of trees and urban green areas. It can help to promote several native species and bring under control those currently endangered in their natural habitats. It was therefore proposed in the framework of this study to make an inventory of the woody plant flora in Lomé, the

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Figure 1. Study area.

capital city of Togo. A specific focus was done on the identification of trees planted in the city and the description of their current management methods. The challenge is that many programs and development projects are underway or planned. This stage of scientific knowledge is urgent to optimize the development plans in urban forestry and to create methods of managing trees and urban green areas. The main target is to promote consideration of diversity and importance of urban trees in an integrated and adapted planning framework. It finally allows emphasizing the importance of the indigenous flora in urban areas, facing the effect of climate change and natural habitat deterioration.

MATERIALS AND METHODS

Lomé, capital town of Togo was the study area (Figure 1). It is located in the southern coastal plain of Togo in sub-equatorial climate with two rainy seasons (April to July, September to October) and two dry seasons (November to March, August). Lomé was the driest station in the coastal plain with an annual average rainfall of 800 mm. The average temperature during the period of study was 27°C and the annual average humidity constantly high, varied between 80 and 90%. The annual average temperature is flattened (3 to 4°C) and kept within 25 to 29°C. The potential evapotranspiration (ETP Penman) is about 1610 mm per year.

The flora of the coastal plain is a mosaic of crops and fallow lands, thickets, shrubs, derived savannah, coastal grasslands and savannah with bushy termite mounds coexisting with forest patches (Ern, 1979 ; Brunel et al., 1984, Kokou, 1998). Floristic surveys were carried out, using a geographic map (IGN, 1/200 000). The botanical inventories were carried following a conventional sampling based on transect. In total, 87 transects of 2.5 Km by 5 m with a total surface of 103.5 km² (10350 ha) and over a coastal length of 10 Km, helped to record all the trees and shrubs of dbh (diameter at breast height) ≥ 10 cm. The species were identified scientifically on the field using the flora of Brunel et al. (1984), Grisvard et al. (1990) and Lebrun and Stork (2003, 2006, 2008). These identifications were later confirmed at the National Herbarium of Togo. The names of authors as well as the natural origins of the species were obtained using data from the International Code of Botanical Nomenclature (2007) and databases from Index Nominum Genericorum (ING), the International Plant Names Index (IPNI) and flowering plants of Africa by Lebrun and Stork (2003, 2006, 2008). For each species, the phytogeographical origin (Ake, 1984) and the life form

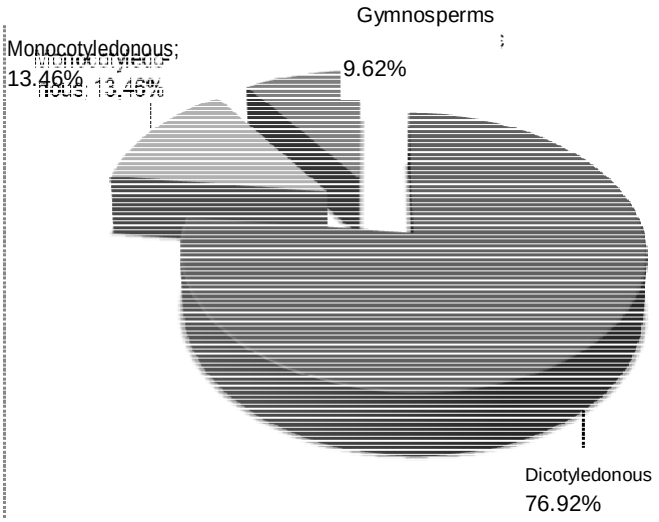


Figure 2. Taxonomic distribution of trees in Lomé, 2009

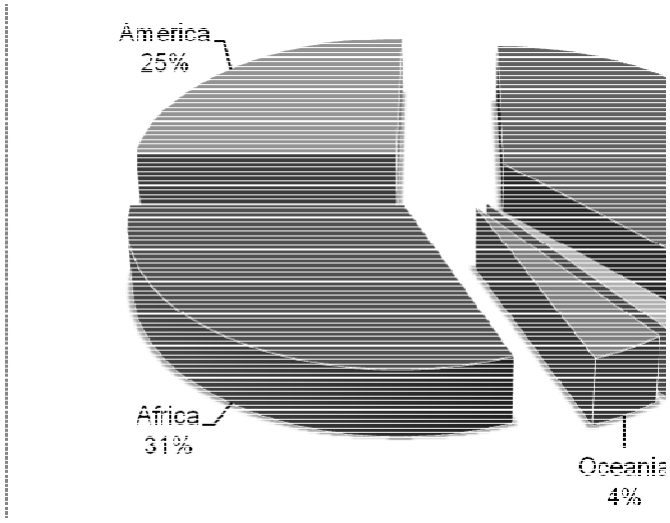


Figure 3. Distribution of trees in Lomé according to their native continents.

(Raunkier, 1934; Kalanda, 1981 in Cikuru, 1982) were determined.

On the basis of the findings of this inventory, a floristic list was established for the whole intakes. The floristic structure was analyzed by the determination of the abundance, the dominance and the taxon's frequency.

RESULTS

The following classification was identified: 1- trees planted at the roadsides; 2- trees in gardens of public services, inside houses, in front of the apartments and shady trees; 3- trees used as fences for houses; 4- trees planted inside uninhabited lands; 5- trees at the seaside. 297 plant species belonging to 141 genera and 52 families (Appendix 1: List of woody species present in urban forestry in Lomé) were recorded. The species were distributed among the major taxonomic groups with 76.92% of Dicotyledonous, 13.46% Monocotyledonous and 9.62% of Gymnosperms (Figure 2). Some large sized monocotyledons were considered as urban trees like *Cocos nucifera*, *Elaeis guineensis* and *Ravenala madagascariensis*. The inventory revealed that more than half of the listed species were not reported in the flora of Togo. Only 10 of them were reported as cash crops.

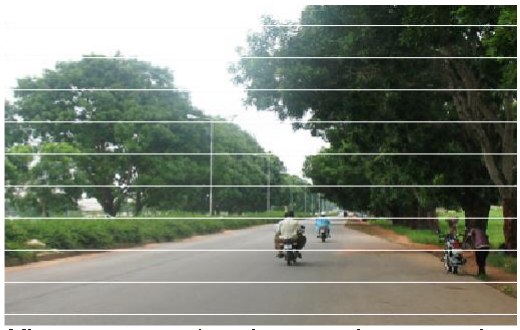
The best represented families were Euphorbiaceae (43 species grouped in 8 genera), Arecaceae (24 species in 20 genera), Acanthaceae (17 species from 11 genera), Moraceae and Araliaceae (15 species per family). These species accounted for 44% of all those listed. Families represented by a single species were Anacardiaceae, Bixaceae, Caricaceae, Flacourtiaceae Lecythidaceae, Moringaceae, Oxalidaceae, Polygonaceae, Sapindaceae, Sapotaceae, Sterculiaceae, Turneraceae, Zygophyllaceae, Musaceae and Strelitziaceae. Some edible fruit species including 7 species, (*Artocarpus altilis*, *Citrus sinensis*, *Citrus lemon*; *Coccoloba uvifera*, *C. nucifera*, *Mangifera indica* and *Terminalia cattapa*) were also considered as ornamental trees (Appendix 1).

Figure 3 showed that only 31% of the plant species encountered in Lomé are native to Africa while 69% were found to be from other continents including 38%, as native species from Asia and 25% as native species from American continents. Among dicotyledonous plants that accounted for 79% of the taxa, 54% originated from America; and monocotyledonous African species represented 15%. This percentage represents 20% of dicotyledons. More than 53% of the gymnosperms recorded on the field are native to America while only 10% are African native species. Trees planted at the roadsides, usually on both sides of the roadway are *Delonix regia*, *Khaya senegalensis* and *Tectona griandis*. Trees found in public services' gardens, houses and in front of apartments, as well as shady trees were characterized by species like *Guaiacum officinale*, *Polyalthia longifolia*, *Roystonea regia* and many Ficus. The trees used as fence of houses were *Ixora macrothyrsa*, *Pithecellobium dulce*, *Thevetia neriifolia* and *T. peruviana*. These species constituted strong hedges bordering private properties. *Cassia siamea*, *Eucalyptus* spp., *Millettia thonningii*, *T. cattapa*, *T. mantaly* were found to be tree species frequently planted in the uninhabited lands, courtyards or planted to fill the open spaces adjacent to buildings. The last type of urban forest includes the trees lining the sandy beach and characterized mainly by *C. nucifera* and *Casuarina*

Polyalthia longifolia in alignment in a garden

Mixed forest dominated by *Senna siamea* and *Azadirachta indica*

Monospecific forest made of *Senna siamea* (syn. *Cassia siamea*)



Khaya senegalensis along boulevard

Tectona grandis planted on both sides of an avenue

Forest of *Azadirachta indica* in the courtyard of a public institute

Figure 4. Some types of urban forests in Lomé.

equisetifolia.

DISCUSSION

The results of this study showed that only 31% of trees in Lomé are African native species and 69% are exotic, that is, originated from other continents. This percentage was found to be slightly low when compared to that pointed out by Aké (2002) in Côte d'Ivoire where exotic species account for 77%. Out of the 31% African native plant species found, less than 6% were from the local flora. These indigenous plant species were less spread, although they contained several useful ornamental species likely to be improved namely for the production of bright colours or large flowers. The ornamental plant market is booming (Jaffee and Masakure, 2005; Roy and

Thorat, 2008; Neven et al., 2009) while woody forest species are certainly meant for a promising future in the horticultural market. As shown in this study, wild plants produced in nurseries are scarce in this market. It is much better to use an indigenous plant, which comes from an environment similar to that in which it will be planted than buying exotic plants.

When the climate of a given continent gets closer to that of tropical Africa, the number of species from that continent gets high. This can be applied to America and Asia continents which represent 25 and 38% of the horticultural species in Africa, respectively. Plants from the Mediterranean and Australian climate were imported and they grow slightly well in Togo like in most African countries. Currently, 25% of the flora in Quebec is exotic and in Canada, out of a total number of 141 species purposely introduced, 73 or nearly 52% were considered as decorative or ornamental plants (Baudin, 2007). These results recall for reflection on the role of native species in the horticultural flora and the importance of their production.

Out of the classification of the urban forest proposed in the present study, many species belong to several types of trees are multipurpose (Kuchelmeister and Braatz, 1993). Furthermore, the trees found by the seaside and those grown along the avenues (Figure 4), currently with larger height do not receive silvicultural maintenance. They grow in an uncontrolled manner and whenever they receive any given treatment, the branches are cut bluntly without aesthetic or the trees are merely or simply felled. Courtyard or reforestation trees are usually planted in alleys and are subject to little maintenance. Trees used for fencing rarely exceed the human height (2 m): they are regularly subject to ornamental pruning. Trees found inside parks, as well as those serving as radiant hedges are subject to regular pruning maintenance. Their heights vary as slightly as the shapes given to the hedges. The pruning is made following the principles of "French park" characterized by polished, neat and well straight structures, with symmetries and panoramic views, axes easy to understand at a glance (Walpole, 2002; Baridon, 2004). However, the outer hedges are taller than those used as fences, demarcating areas of the same garden. In this case, the pruning is designed to have the aerial part of the tree meeting the needs of the owner. The latter is concerned with the need for security, preventing the inconveniences to nearby residents or aesthetics needs (Latchoumy, 2007). The products of the pruning are used as fuel wood for households (N'zala, 2002).

The number of identified species showed that, the plant flora of Lomé is fairly diversified. Development projects in the city of Lomé, especially repairing of the public roads include tree planting program. However, foresters and professional planners still play a minor role in the greening initiatives (N'zala, 2002) since they are rarely consulted. The ongoing management of plant heritage, carried out by the department of green area of the municipality should include the overall supervision, the maintenance and the plant heritage preservation. Most of the services could be assigned to such a business related provider on the basis of competitive bid for tender launched every three years to select the services provider. A pricelist would allow the financial management of provider's services.

Conclusion

The identification and knowledge of trees in Lomé are a vital factor in the development of green areas. This study yields a list of species that contribute to the beautification of the streets and avenues of the city, the production of shade and protection of the environment service. It has come out with a classification of forest types and pointed out the importance of local species in this plant diversity. Research is fundamental for the development of the native flora, the broadening of the presented list range and the streamlining of this heritage management.

This work is a prerequisite for any urban forestry work and urban plants management and for such a management in Lomé, the design of a database becomes a necessity. The forestry work carried out on trees in Lomé requires the training of skilled technical personnel for a rigorous and professional maintenance towards a sustainable urban forestry. Producers of ornamental plants should preferably be educated to develop appropriate methods for the growing market demand while respecting the resource and sustainable development standards.

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Appendix 1. List of woody plant species present in urban forest areas in Lomé (Togo's capital).

Araucariaceae
Araucaria cunninghamii Ait.
Araucaria excelsa R. Br.

Cupressaceae
Callitris intratropica R.T. Baker & H.G. Sim.
Cupressus sempervirens L.
Thuja occidentalis L.

Cycadaceae
Cycas circinalis L.
Cycas revoluta Thunb.

Pinaceae
Pinus canariensis Sm.
Pinus caribaea Morelet

Zamiaceae
Encephalartos ferox L.
Encephalartos gratus L.
Zamia dudgesiana L.
Zamia dominican Hort.
Zamia fisheri L.
Zamia floridana L.
Zamia furfuracea L.
Zamia fusca Hort.Paull. ex Regel
Zamia pumila L.
Zamia standley Hort.

Acanthaceae
Acanthus mollis L.
Acanthus pubescens Engl.
Aphelandra squarrosa Nees.
Barleria lupulina Lindl.
Crossandra infundibuliformis (L.) Nees.
Crossandra nilotica Oliv.
Graptophyllum pictum Nees
Jacobinia pohliana Benth. & Hook. f.
Pachystachys lutea Nees
Pseuderanthemum atropurpureum Hort. var.tonga
Pseuderanthemum reticulatum Hort.
Sanchezia nobilis Hook.
Strobilanthes dyerianus Mast.
Strobilanthes maculata Nees.
Thunbergia erecta (Benth.) T. Anders.
Thunbergia fragrans Roxb.
Thunbergia grandiflora (Roxb. ex Rottl.) Roxb.

Anacardiaceae
Anacardium occidentale L.

Annonaceae
Cananga odorata (Lam.) Hook. f. & Thoms.
Polyalthia longifolia L.
Polyalthia longifolia var. pendula L.

Apocynaceae
Adenium obesum (Forssk.) Roem. & Schult.
Allamanda cathartica L. var. hendersonii Hort.
Allamanda neriifolia Hook.
Allamanda violacea Gardn.
Nerium oleander L.
Nerium oleander L. var. variegatum
plenum *Plumeria rubra* L.
Plumeria rubra f. tricolor (Roem. & Pav.) Woodson
Thevetia neriifolia Juss. ex Steud. *Thevetia peruviana* (Pers.) Merr.
Strophanthus gratus (Hook.) Franch.

Asclepiadaceae
Asclepias curassavica L.
Calotropis procera (Ait.) Ait. f.
Cryptostegia grandiflora Br. R. ex Lindl.
Cryptosegia madagascariensis Boj.
Vernonia colorata (Willd.) Drake

Bignoniaceae
Crescentia cujete L.
Jacaranda mimosaefolia Don D.
Millingtonia hortensis L. f.
Newbouldia laevis (Beauv.) Seem. ex Bureau.
Parmentiera edulis DC.
Spathodea campanulata P. Beauv.
Tecoma stans Griseb.

Bixaceae
Bixa orellana L.

Bombacaceae
Adansonia digitata L.
Ceiba pentandra (L.) Gaertn.

Annonaceae
Cananga odorata (Lam.) Hook. f. & Thoms.
Polyalthia longifolia L.
Polyalthia longifolia var. pendula L.

Appendix 1. Contd.

Caesalpiniaceae
Bauhinia acuminana L.
Bauhinia monandra Kurz.
Bauhinia rufescens Lam.
Bauhinia tomentosa L.
Caesalpinia pulcherrima Sw.
Cassia laevigata Willd.
Cassia obtusifolia L.
Cassia occidentalis L.
Cassia sieberiana DC.
Cassia spectabilis DC.
Cynometra megalophylla Harms
Parkinsonia aculeata L.
Senna alata (L.) Roxb.
Senna siamea (Lam.) Irwin et Barneby

Fabaceae
Delonix regia (Bojer) Raf.
Dialium guineense Willd.
Peltophorum pterocarpum (Decne.) Benth.

Flacourtiaceae
Flacourtia flavescens Willd.

Lauraceae
Cinnamomum zeylanicum L.
Persea americana Mill.

Lecythidaceae
Napoleonaea vogelii Hook. & Planch.

Lythraceae
Lagerstroemia indica L.
Lawsonia inermis L.

Malvaceae
Hibiscus arnottianus A. Gray
Hibiscus rosa-sinensis L.
Hibiscus rosa-sinensis L. var. california gold
Hibiscus rosa-sinensis L. var. cooperi
Hibiscus rosa-sinensis L. var. crown of Bohemia
Hibiscus rosa-sinensis L. var. mist
Hibiscus rosa-sinensis L. var. scarlet'
Hibiscus rosa-sinensis L. var. albus
Hibiscus rosa-sinensis L. var. natal
Hibiscus rosa-sinensis L. var. plenus
Hibiscus schizopetalus (Mast.) Hook. f.
Thespesia populnea Soland. ex Corrêa

Caricaceae
Carica papaya L.

Euphorbiaceae
Acalypha hispida Burm.
Acalypha wilkesiana Müll. Arg.
Acalypha wilkesiana Müll. Arg. var. hoffmanii
Acalypha wilkesiana Müll. Arg. var. moorea
Acalypha wilkesiana Müll. Arg. var. 'java white'
Acalypha wilkesiana Müll. Arg. var. macrophylla
Acalypha wilkesiana Müll. Arg. var. tricolor
Breynia disticha J.R. & G. Forst. *Breynia nivosa* Small.
Codiaeum variegatum (L.) Bl. 'Clipper'
Codiaeum gloriosum superbum'
Codiaeum frutescens var.'Wellpark-Beauty'
Codiaeum variegatum (L.) Bl.
Codiaeum variegatum (L.) Bl. var.' america'
Codiaeum variegatum (L.) Bl. var. aucubifolium
Codiaeum variegatum (L.) Bl. var. cornutum
Codiaeum variegatum (L.) Bl. var.craigii *Codiaeum variegatum* (L.) Bl. var. 'delaruye' *Codiaeum variegatum* (L.) Bl. var. 'elaine' *Codiaeum variegatum* (L.) Bl. var. exotica *Codiaeum variegatum* (L.) Bl. var.'General Paget' *Codiaeum variegatum* (L.) Bl.var. gloriosum *Codiaeum variegatum* (L.) Bl. var. imperialis *Codiaeum variegatum* (L.) Bl. var. lineatum *Codiaeum variegatum* (L.) Bl. var.Mortimer *Codiaeum variegatum* (L.) Bl. var. punctum aureum *Codiaeum variegatum* (L.) Bl. var.rubrum *Croton zambesicus* Müll. Arg.
Euphorbia lactea Haw.
Euphorbia millii Des Moul. var. breonii *Euphorbia oncoclada* Drake.
Euphorbia tirucalli L. *Euphorbia deightonii* Croizat
Hura crepitans L.
Jatropha curcas L.
Jatropha gossypifolia L.
Jatropha multifida L.
Jatropha pandurifolia Andr.
Jatropha podagrica Hook.
Pedilanthus tithymaloides Poit.
Pedilanthus tithymaloides Poit. var. variegata
Phyllanthus angustifolius Sw. *Ricinus communis* L.

Appendix 1. Contd.

Meliaceae
Azadirachta indica A. Juss.
Melia azedarach L.
Khaya senegalensis A.Juss.

Mimosaceae
Acacia auriculaeformis A.Cunn. ex Benth.
Acacia biflorus R.Br.
Acacia farnesiana (L.) Willd.
Acacia nilotica (L.) Willd. Ex Del.
Adenanthera pavonina L.
Calliandra surinamensis Benth.
Pithecellobium dulce(Roxb.) Benth.
Samanea saman (Jacquin) Merrill

Moringaceae
Moringa oleifera L.

Myrtaceae
Eugenia uniflora L.
Psidium guayava L.
Eucalyptus citriodora Hook.
Eucalyptus deglupta Blume
Eucalyptus tereticornis Hook.
Eucalyptus torrelliana F. Muell.

Nyctaginaceae
Bougainvillea glabra Choisy
Bougainvillea spectabilis Willd.
Bougainvillea spectabilis Willd. var.alba plena
Bougainvillea spectabilis Willd. var. 'Mary Palmer
Bougainvillea spectabilis Willd. var. rubra plena
Bougainvillea spectabilis Willd. var. variegata
Bougainvillea x buttiana Holttum & Standl.
Bougainvillea x *buttiana* Holtt. var. Mrs. McLean
Bougainvillea x *buttiana* Holtt. var. praetoria
Bougainvillea harrisii

Punicaceae
Punica granatum L.
Punica granatum L. florepleno

Dracaenaceae
Dracaena arborea (Willd.) Link
Draceana fragans massangeana Ker-gawl.
Dracaena godseffiana Bak.
Dracaena godseffiana Bak. var. friedmanii *Draceana marginata* Link.
Dracaena sanderiana Hort.

Casuarinaceae
Casuarina equisetifolia L.

Combretaceae
Quisqualis indica L.
Terminalia cattapa L.
Terminalia mantaly H.Perrier

Moraceae
Artocarpus nobilis J.R. & G. Forst.
Ficus bengamina L.
Ficus bengamina L. 'Variegata'
Ficus benjamina L. 'Starlight'
Ficus benghalensis L.
Ficus craterostoma Mildbr. & Burret
Ficus elastica Roxb.
Ficus elastica Roxb.'Decora'
Ficus elastica Roxb. 'Doescheri'
Ficus elastica Roxb.'Schryveriana'
Ficus lyrata L.
Ficus polita Vahl.
Ficus retusa L.
Ficus rubiginosa Desf. ex Vent. var. variegata Guilf.
Ficus triangularis Warb.

Oleaceae
Jasminum nitidum Skan
Jasminum officinale L. affine (Royle ex Lindl.) Rehder

Oxalidaceae
Averrhoa caramibola L.

Papilionaceae
Cordyla pinnata (Lepr. Ex A.Rich.) Milne-Redhead *Erythrina indica* Lamk. picta L.
Millettia thonningii (Schum. & Thonn.) Baker
Sesbania grandiflora (L.) Poir. Cv. Alba
Sesbania rostrata Brem.

Polygonaceae
Coccoloba uivifera L.

Rutaceae
Citrus aurantifolia (Christm.) Swingle
Citrus grandis (L.) Osbeck
Citrus limon Burm. f.
Citrus reticulata Blanco
Citrus sinensis Osbeck
Murraya paniculata (L.) Jacq.

Appendix 1. Contd.

Musaceae
Musa zebrina Van Houtte ex Planch.

Strelitziaceae
Ravenala madagascariensis Gmel. J.F.

Strelitziaceae
Ravenala madagascariensis Gmel. J.F.

Verbenaceae
Clerodendrum fragrans Vent.
Clerodendrum inerme L. *Clerodendrum speciosissimum* Drapiez *Clerodendrum thomsonae* Balf. *Clerodendrum* x *speciosum* Gürke *Gmelina arborea* Roxb. *Gmelina asiatica* L.

Lantana camara L.
Stachytarpheta cayenensis (L.C. Rich.) Schau.
Stachytarpheta speciosa Hort.
Tectona grandis L. f.

Araliaceae
Aralia elata Seem.
Aralia elata Seem. Variegata
Dizygotheca elegantissima (Veitch ex Mast.) R. Vig. & Guillaumin
Dizygotheca reginae (Linden ex W. Richards) Hemsl.
Nothopanax filicifolia Bailey
Polyscias palapala Hort.
Polyscias balfouriana Bailey
Polyscias guilfoylei L.H. Bailey laciniata
Polyscias balfouriana Bailey pennockii
Polyscias filicifolia Bailey
Polyscias guilfoylei Bailey
Polyscias guilgoylei Bailey victorae Bailey *Polyscias scutellaria* (Burm.f.) Fosberg *Schefflera arboricola* (Hayata) Merr. *Schefflera farinosa* (Blume) Merr.

Agavaceae
Cordyline fruticosa (L.) A.Chev.
Cordyline terminalis (L.) Kunth
Cordyline terminalis (L.) Kunth var. amabilis
Cordyline terminalis (L.) Kunth var. calypso queen
Cordyline terminalis (L.) Kunth var. firebrand
Cordyline terminalis (L.) Kunth var. hawaii bonsai
Cordyline terminalis (L.) Kunth var. in habitat
Cordyline terminalis (L.) Kunth var. liliput

Sterculiaceae
Sterculia foetida L.

Turneraceae
Turnera ulmifolia L.

Zygophyllaceae
Guaiacum officinale L.

Rubiaceae
Gardenia jasminoides fortuniana Ellis
Ixora chinensis Lamk.
Ixora coccinea Hort.
Ixora finlaysoniana L.
Ixora javanica DC.
Ixora macrothyrsa Hort
Ixora macrothyrsa 'Super King'
Ixora odorata Hook.
Pentas lanceolata (Forsk.) Deflers pallida
Mussaenda erythrophylla Schumach. & Thonn. *Mussaenda philippica* A.Rich.

Arecaceae
Areca triandra Roxb.
Bismarckborassusia nobilis Hildebr. & H.Wendl.
Borassus aethiopum Mart.
Brahea armata Wats.
Caryota mitis Lour.
Chamaedorea elegans Mart.
Chamaerops humilis L.
Chrysalidocarpus lutescens Wendl.
Cocos nucifera L.
Coccothrinax elegans O. Muñiz & Borhidi 'Bella' *Coccothrinax fragrans* Burret
Corypha umbraculifera L. *Elaeis guineensis* Jacq. *Howeia forsteriana* Becc. *Licuala grandis* H. Wendl. *Licuala rumphii* Blume *Licuala spinosa* Wurmb.
Linospadix monostachya H. Wendl. *Livistona australis* Mart. *Livistona chinensis* Mart.

Pritchardia beccariana Jacq.
Rhapis excelsa Henry
Roystonea regia O.F. Hook.
Washingtonia filifera Wendl.

Appendix 1. Contd.

Poaceae	**Sapindaceae**
Bambusa nana Roxb.	*Blighia sapida* C. Koenig
Bambusa multiplex (Lour.) Raeusch. ex Schult. & Schult. f.	
Bambusa vulgaris Schrader ex Wendl.	