Electronic lecture note

HRT 507 – Ornamental Horticulture

O.M. Olosunde (Co-ordinator).
O.O. Olubode

A. Course outline

Identification of tropical ornamental plants. Culture of trees, shrubs and flowers. Shade trees, ground covers, annual flowers, perennial shrubs, hedge plants, bedding and foundation plants, lawn grasses, palms as ornamental plants, cut flowers, indoor plants etc. Nursery management.

Practical: Identification of various species of trees, shrubs, hedges etc. Plant propagation, cutting and seeds etc. Potting media, flower arrangement, pot plant production, home beautification-interior and exterior decoration

General Introduction:

Definition of Horticulture

Branches: Pomology, Olericulture, Floriculture, landscape Horticulture, Horticultural Engineering etc.

Ornamental plant industry: prospects and problems

B. Hedges/ Screens: All plants in this category are well foliage from the ground to up, able to provide a dense separation or screen in a landscape. Some are knee-high shrublets good for edging or to demarcate boundaries, walkway or path; at the other extreme are shrubby trees that grouped closely, can block objectionable view or direct the eye to a garden focal point. They are able to tolerate shearing into formal hedges or as informal

hedges. A hedge plants should have good branching ability, evergreen, perennial and be easily controlled.

Examples:

S/N	Scientific name	Common name	Family	Mode of propagation
1.	*Codiaeum variegatum*	Croton	Euphorbaceae	stem cuttings
2.	*Ixora javanica*	Single red ixora	Rubiaceae	stem cuttings, seed - very slow growth
3.	*Murraya paniculata*	Jack orange, Orange jasmine	Rutaceae	seed, stem cuttings - difficult to root
4.	*Durranta repens* - *Durranta erecta*	Golden dewdrop	Verbanaceae	stem cuttings
5.	*Hibiscus rosa-sinensis*	Hibiscus	Malvaceae	stem cuttings
6.	*Thevethia peruviana*	Milk bush	Apocynaceae	seed, stem cuttings – occasionally
7.	*Acalypha spp*	Acalypha	Euphorbaceae	stem cuttings
8.	*Allamanda cathatica*	Yellow allamanda	Apocynaceae	stem cuttings
9.	*Ficus retusa*	yellow ficus	Moraceae	stem cuttings
10.	*Eugenia uniflora*	Pitanga cherry	Euphorbaceae	seeds, stem cuttings – occasionally

C. Foundation plants: They are plants established next to the foundation of the building. They provide transition from house to garden by hiding the unattractive house foundation.

Examples:

S/N	Scientific name	Common name	Family	Mode of propagation
1.	*Euphorbia splendens*	Crown of thorns	Euphorbiaceae	Stem cuttings
2.	*Setcreasea purpurea*	Purple heart	Commenlinaceae	Stem cuttings, plantlets
3.	*Strelitzia reginae*	Bird of paradise	Strelitziaceae	Plantlets/suckers

4.	*Canna indica*	Canna	Cannaceae	Plantlets/suckers
5.	*Rheoe discolour*		Bromiliaceae	Plantlets
6.	*Codiaeum variegatum*	Croton	Euphorbaceae	stem cuttings
7.	*Ixora hybrids*	dwarf ixora	Rubiaceae	stem cuttings, seed - very slow growth
8.	*Ficus retusa*	Yellow ficus	Moraceae	stem cuttings
9.	*Acalypha wilkisiana*	Acalypha	Euphorbaceae	stem cuttings
10.	*Euphorbia tithymaloides/ Pedilanthus tithymaloides*	Devil's backbone	Euphorbaceae	Stem cuttings

D. Ground covers: They are plants that generally adorn and complement the greenery of the lawns / grasses established to protect and preserve the soil or base line of an environment. The best known ground cover is lawn and it unsurpassed as a surface to work or play upon. But where foot traffic is not important or not wanted many other ground cover plants can offer much of a lawn's neatness and uniformity with considerably less maintenance. Choices of ground cover run the gamut of foliage textures and colours or production of colourful flowers. Pattern planting can be made using different ground cover to contrast pleasantly with one another. Most ground covers function as barriers in the landscape, rather than as the green bridge between areas a lawn provides.

Examples:

S/N	Scientific name	Common name	Family	Mode of propagation
1.	*Begonia rex*	begonia	Begoniaceae	Stem cuttings
2.	*Peperomia sandesii*	Peperomia	Piperaceae	Stem cuttings
3.	*Alternanthera bettzickiana*	joyweed	Amaranthaceae	Stem cuttings
4.	*Portulaca*	Rose moss	Portulaceae	Stem cuttings

	grandiflora			
5.	*Catharanthus roseus*	Rose periwinkle	Apocynaceae	Seeds
6.	*Canna indica*	Canna lily, Indian shot	Cannaceae	Plantlets
7.	*Caladium bicolor*	Elephant ear, Heart of Jesus	Araceae	Tubers
8.	*Rheoe discolour*	Moses in the boat	Commelinaceae	Plantlets
9.	*Tulip*	Easter lilly	Lilliaceae	Bulbs
10.	*Setcreasea purpurea*	Purple heart	Commenlinaceae	Stem cuttings, plantlets

E. Ornamental Shrubs: Shrubs are woody plants that usually increase in size by growing new wood from older wood as well as by extending new stems from the plant's base. Unless specially trained, a shrub will have several to many stems that rise from ground level or close to it. Shrubs are low growing trees usually used as meadows and ornamental spot plants in an environment, they range from ankle-height Lilliputians to multi-stemmed Gullivers you can actually work under.

Examples:

S/N	Scientific name	Common name	Family	Mode of propagation
1.	*Nerium oleander*	Oleander, Rose bay	Apocynaceae	Stem cuttings
2.	*Bauhinia variegate var candida*	Orchid tree	Leguminisae	Seeds
3.	*Murraya paniculata*	Jack orange	Rutaceae	Seeds
4.	*Caessalpinia pulcherima*	Bride of Barbados	Leguminosae	Seeds
5.	*Thevethia peruviana*	Milk bush	Apocynaceae	Seeds
6.	*Thuja occidentalis*	Thuja, red cedar	Cupressaceae	Stem cuttings
7.	*Bauhinia tomentosa*	Orchid tree	Leguminosae	Seeds
8.	*Mussaenda philippica*	Queen of the Philippines	Rubiaceae	Stem cuttings
9.	*Cassia corymbosa*		Leguminosae	Seeds

10.

F. Trees in Landscaping: Though no distinct line separate a tree from a shrub, except that a typical tree grows a single trunk, rising from the ground and branches out higher up. There are trees that reach a maturity at 15 feet tall, but some shrub reach up to 20 feet. Some of these shrubs serve as some trees, particularly if the lower branches are removed. Therefore, a tree is a large, woody plant having one or several trunks topped by a foliage canopy. The arborist defines trees as 'Single-trunked woody plants attaining a height of at least 200 feet'. Tall growing plant species for shade provision (flame of the forest, etc.), avenue plantings (Cassia fistula), ornamental plants (Tabebua rosea), fruit trees (Mango or Citrus, etc.), wind breaks (eucalyptus, teak, etc),

Examples:

S/N	Scientific name	Common name	Family	Mode of propagation
1.	*Samanea saman/ Albizia saman*	Rain tree	Leguminosae	Stem cuttings
2.	*Polyalthea longifolia*	Masquerade, police, Ashoka tree	Annoonaceae	Seeds
3.	*Cassia fistula*	Golden flower tree	Leguminosae	Seeds
4.	*Araucaria excelsa*	Araucaria	Araucariaceae	Seeds, apical cuttings(though destroys plant architecture)
5.	*Plumeria rubra*	Frangipanii	Apocynaceae	Stem cutting
6.	*Terminalia catappa*	Indian almond	Combretaceae	Seeds
7.	*Ficus benjamina*	Weeping fig	Moraceae	Stem/pole cuttings
8.	*Citrus sinensis*	Sweet orange	Rutaceae	Budded seedlings
9.	*Plumeria acutifolia*	Frangipanii	Apocynaceae	Stem cutting
10.	*Delonix regia*	Flame of the forest,	Leguminosae	Seeds

	flambouyant tree

G. Lawn grasses: Lawn or turf usually refers to area of land planted to grasses that is kept close cut and smooth. Such grasses or creeping legumes are perennial plants to ensure a complete cover of the ground as desired in places like residential /private lawns, parkways, rood sides, golf courses, sporting fields etc.

A lawn is a small to medium sized area of land planted to intensively managed grass and valued for its beauty and environmental effects.

A turf is a large expanse of land planted to intensively managed grass and used for recreational purposes such as golfing, horse racing, soccer etc.

Ordinarily ornamental grasses are many. However in Nigeria few are commonly used. For example,

Bahama grass (*Cynodon dactylon*) is a low maintenance grass and takes a lot of abuses like trampling, driving on it and still survive etc. Predominantly all football pitches are established with bahama grass and lawns generally on large areas. It is the cheapest of grasses used in Nigeria in terms of establishment and maintenance cost.

Method of establishment: establish with the aids of stolons. Get stolon usually uprooted with soil. The nodes are covered with soil and leave green leaves uncovered. They can be cut in to pieces and planted at regular spacing of 45 cm between rows and 15 cm within rows. Continuous planting consume more grasses but get established very easily.

Maintenance: After planting water profusely, then apply fertilizer or manure after emergence/establishment and mow occasionally. Watering frequencies may be high during the dry season to keep the lawn green

Carpet grass (*Axonopus compresus*): Utility for carpet grass is different, usually it grow well in area with high soil water table. It grow faster and produce seeds frequently than bahama grass. Mostly used in medium maintenance situation.

Method of establishment: establish with the aids of stolons and seeds. Get stolon usually uprooted with soil. The nodes are covered with soil and leave green leaves uncovered. They can be cut in to pieces and planted at regular spacing of 45 cm between rows and 15 cm within rows. Continuous planting consume more grasses but get established very easily. If available and ground adequately prepared establishment using seeds is better and less expensive.

Maintenance: To keep it beautiful watering, mowing and fertilizing must be frequent than as found in bahama grass.

Zoysia grass (*Zoysia tennuifolia*) : It is a widely used in important areas as those for VIPs and 5 star hotels and so on. It takes long time before covering the ground, but can tolerate shade and still grow luxuriantly. It is expensive than bahama and carpet grasses.

Method of establishment: Zoysia establishment is through rhizomes as it has no conspicuous stolons. Rhizomes should be uprooted with a lump of soil under it to increase it chance of survival. Shovel can be used to uproot and roll as if one is rolling a

carpet (sodding method). The lump can also be cut in to sets (plugs) or pieces (sprigs) before planting.

Maintenance: It requires high and regular maintenace

Examples

S/N	Scientific name	Common name	Family	Mode of propagation
1.	*Axonopus compresus*	Carpet grass	Poaceae	Seeds, sprigs, plugs, sods
2.	*Cynodon dactylon*	Bahama grass	Poaceae	sprigs, plugs, sods
3.	*Zoysia tennuifolia*	Zoysia grass	Poaceae	sprigs, plugs, sods
4.	*Zoysia japonica*	Zoysia grass	Poaceae	sprigs, plugs, sods
5.	*Chrysopogium gayanum*	Porharcout grass	Poaceae	sprigs, plugs, sods

H. Ornamental palms: Palms come in all shapes and sizes. The height will range from 5 (1.5) or 6 (1.8 m) feet to 100 feet (30.48 m). Many palms have an economic and all have a decorative value. The presence of palm trees is in fact the main difference between a tropical landscape and a temperate one. Palms are divided in to two groups; the pinnate or feathery leaf types and palmate or fan leaf types. T o the landscape gardeners the most important is the pinnate palms. Pinnate palms can be used in any setting. They can be planted as a single specimen or grouped together to form an attractive background.

Examples:

S/N	Scientific name	Common name	Family	Mode of propagation
1.	*Cycas revolute*	Sago palm/ cycads	Palmae	Plantlet/sucker
2.	*Cycas circinalis*	Sago	Palmae	Plantlet/sucker

		palm/cycads		
3.	*Caryota mitis*	Fish tail palm	Palmae	Seeds
4.	*Roystonia regia/ Oreodoxa regia*	Royal palm	Palmae	Seeds
5.	*C*	King palm	Palmae	Seeds
6.	*Chrysalidocarpus lutescens*	Golden palm	Palmae	Seeds
7.	*Elaeis guineensis*	Oil palm	Palmae	Seeds
8.	*Cocos nucifera*	Coconut palm	Palmae	Seeds

I. Cut flowers: Flowers are no longer considers as a luxury. In addition to home decoration they are often given as gifts at marriages, births, birthdays and are important features of some social events and festivals. Cut flower industry worth billions of US dollar across the globe, thus growing of cut flowers creates abundant opportunity to Nigeria as a means of diversifying her economy. Everything in Nigeria is favourable for cut flower production; land and labour is available, trained staff are either available or can be trained, the climate is suitable for all year round harvesting and Nigeria is near to Europe than either South America or Asia.

Examples plants for cut flower production:

S/N	Scientific name	Common name	Family	Mode of propagation
1.	*Rosa chinesis,*	Rose plant	Rosaceae	Stem cuttings, layering
2.	*Anthurium andraenum*	Flamingo, tail flower etc	Araceae	Plantlets
3.	*Gladiolus hybidus*	Sword lilly	Lilliaceae	Bulb
4.	*Phalaenopsis spp*		Ochidaceae	
5.	*Arachnis maigayi*	Scorpion orchid	Ochidaceae	Stem cuttings
6.	*Strelitzia reginae*	Bird of paradise	Strelitziaceae	Plantlets/suckers

7.	*Heliconia bihai*	Lobster claw	Heliconiaceae	Plantlets/suckers
8.	*R. gallica*	Rose plant	Rosaceae	Stem cuttings, layering
9.	*Dianthus caryophyllus*	carnations	Caryophyllaceae	Cuttings
10.	*Acacia dealbata*	Silver wattle	Fabaceae	Seeds

J. Indoor plants: An indoor plant, sometimes called a houseplant, is a plant that is grown indoors in places such as residences and offices. Houseplants are commonly grown for decorative purposes, positive psychological effects, or health reasons such as indoor air purification. Plants used in this fashion are most commonly, though not always, tropical or semi-tropical. Major factors that should be considered when caring for indoor plants are moisture, light, soil mixture, temperature, humidity, fertilizers, potting, and pest control.

Examples:

S/N	Scientific name	Common name	Family	Mode of propagation
1.	*Aglaonema commutatum*	Chinese evergreen	Araceae	Plantlets
2.	*Dracaena fragrans*	Dracaena	Agavaceae	Stem cuttings
3.	*Ficus benjamina*	Weeping fig	Moraceae	Stem, pole cuttings
4.	*Ficus elastica*	Rubber plant	Moraceae	Stem cutting
5.	*Sansevieria trifasciata*	Mother in-law tongue	Lilliaceae	Leaf cuttings, plantlets
6.	*Dieffenbachia amoena*	Dumb cane, Tropic snow	Araceae	Stem/cane cuttings
7.	*Cordyline terminalis*	Ti-plant	Agavaceae	Stem cuttings
8.	*Maranta leuconeura kerchoveana*	Maranta	Maranthaceae	Plantlets

9.	*Nephrolepis exaltata*	Boston fern	Oleandraceae	Plantlets, spores (seeds) could also be used
10.	*Euphobia tirucali*	Milk bush	Euphobiacea	Stem cuttings

Nursery management practices

Horticultural nursery is a place where propagaules and or seedlings meant for fielg establishment or sale are produced under intensive management.

Factors to consider for sitting of a floricultural plant nursery are

1. Perennial and reliable source of good quality water
2. Accessibility- to bring in inputs with ease and for buyers
3. Adequate land- in terms of land gradient and slope, fertility status etc
4. Proximity to market (where business exist for the floricultural plants e.g urban area, near industrial parks or estate etc
5. Availability of other inputs eg labour, planting materials, potting media, utilities (phone services to enhance business transaction, electricity etc)
6. Absence of diseases, pests and pilfering
7. etc

Types of nursery- → Ground nursery,
→ Polythene bag nursery
→ Bench nursery in green houses

a. Ground nursery:

b. Polythene bag nursery:

c. Bench nursery:

Nursery production options

Hi-technology/standard/permanent nursery: There is high degree of automation and computerization. Every activity that can be done manually are automated. It is fast and convenient but expensive. It has permanent nursery structures.

Intermediate/Medium technology/Temporary nurseries: These are improved types of peasant nurseries. They are used to raise seedlings or to rest seedling prior to transplanting. There are no permanent installations.

Peasant/Low technology nurseries: It a nursery where peasant farmers raise seedling of their crops for planting on their farms or in their compounds. Generally, the site is prepared by underbrushing the undergrowth leaving the big trees to provide shade, the soil tilled, seeds sown and covered lightly with palm fronds which are removed immediately the seeds begin to germinate and emerge

Floricultural Nursery management practices

1. Layout and structures of the nursery: Functionality and workability of the nursery is affected by the layout and adequacy of its essential structures. Therefore, orderly arrangement of the nursery and provision of essential structures and tools facilitate level of success of any nursery.
2. Water management: Water/moisture is the most limiting factor in floricultural nursery industry. Thus, consideration must be given to provision of good quality and adequate quantity of water for irrigating the seedlings. Device for supplying and delivering water to plants is important e.g. watering can, micro jet, mist applicator, sprinkler, hose attached to tap etc.

3. Light/shade management: Provision of shade is essential for healthy seedlings. Lack of shade or excessive shade could result in poor growth of seedlings. Permanent or temporary, partial or full shade may be required depending on the plant type and stage of growth. Information of light saturation for maximum photosynthetic activities is needed e.g for indoor or outdoor plants. Shade cloths with different colours could be used control light quality which also affected seed germination and seedling growth.
4. Sanitation and cleanliness: A tidy nursery will be attractive to workers, clients/customers/buyers as it help to reduce the risk of outbreak of diseases and pests. Used items such as soil, papers, polythene materials, unused pots, instruments should be removed instantly. Weeds should be controlled regularly.
5. Care of nursery tools and materials: Clean implements after use, grease or oil if necessary and properly store. Tools should be properly labeled and their inventory must be kept.
6. Other areas requiring proper management are personel, soil/growing media and disease prevention and control.

Practical:

Identification of various species of trees, shrubs, hedges etc.

1. Collection of plant sample for identification
2. Field trip to gardens

3. Power point presentation of pictures of some plants

Plant propagation, cutting and seeds etc.

:Definition

: Sexual/ seeds and Asexual/ vegetative

Vegetative methods: cuttings, layering, budding, grafting etc

Potting media:

An appropriate potting /growing medium depends on the species, season, cost, availability and must provide sufficient porosity to allow good aeration with high water holding capacity yet it is well drained and free of pathogens

Functions

Anchorage

To provide moisture

Permit penetration to and exchange of air

Create dark or opaque environment by reducing light penetration

Reservoir for nutrients

Examples:

Organic components; peat, sphagnum moss, softwood and hardwood bark etc.

Mineral components: perlite, vermiculite, expanded shale, pumice coarse sand etc

Agricultural/ urban by-products/wastes: rice husk, maize cob, sawdust, wood shavings, charcoal, coconut husk etc.

Flower arrangement

Materails: flower vase (- sizes, colour and composition), scissors, cellophane tape,

Foam etc.

Principles guiding arrangement of flowers

Pot plant production, home beautification-interior and exterior decoration:

Containers for indoor plants can vary in size and colours. It can be made from clay, concrete, wood, ceramic, glass ware, plastic, metal etc.