Unit 4

Growing of Perennials

Perennial is the group of plants that remains productive for many years and gives economic returns continuously, for years together, when planted once. The cycle of production continues year after year or season after season for more than two years. They live longer, are hardy, and can tolerate adverse climate. If once planted or sown, they are not required to be replanted year after year, for example, Amaltas, Bauhinia, Gardenia, Ixora, Jasmine, Quisqualis, Rose, etc.

171210CH04

Types of Perennials

Perennial Herbs or Herbaceous Perennials

Those perennials which have non-woody, soft and fibrous stem, and where aerial plant parts may dry or rot once in a year during adverse weather conditions, are known as herbaceous perennials, such as Carnation, Chrysanthemum, Gerbera, etc.

Climbers

The group of perennials, which have weak stems and require support to climb or creep, are known as climbers. These cannot stand erect without any support. They have specialised organs like tendrils with which they twine to any support to grow vertically (climber), or

may creep over through haustorium or with the help of hooked thorns as creepers, for example, golden shower, rangoon creeper, bougainvillea, money plant, etc.

Shrubs

These perennials are medium bushy plants growing up to 5 m in height but with base-branching, producing hard and woody stems from the ground level such as rose, allamanda, ixora, mussaenda, gardenia, night jasmine, hibiscus, etc.

Trees

The plants which have well defined single woody stem with branching are called trees. The height may be more than 5 meters. Such plants are gulmohur, kadamba, shirish, acacia, michelia, magnolia, ashok, neem, peltophorum, bauhinia, etc.

Uses of Perennials

1. Trees can be planted on avenues and parkings for shade and beautification.
2. Shrubs can be planted as hedges (for creating boundaries and screening) or in groups and for producing loose flowers.
3. Climbers can be trained to climb on trees, buildings, arches, and pergolas to enhance beauty.
4. Some of the perennials like carnation, chrysanthemum, rose, etc., produce cut flowers.
5. They are used as potted plants for indoor beautification of houses, offices, hospitals, schools, and ceremonies.

Session 1: Trees, Shrubs and Vines

Importance of Trees

Commensurately and proportionately planted trees along the buildings make the buildings more valuable. Their proper placing in the garden enhances the visual effect of the garden, and systematically planting the trees along the road sides, apart from providing shade during harsh summer, also give a very pleasing effect. Trees make for a strong framework in landscaping.

Trees are tall growing perennials, with marked trunk and they bear flowers and fruits for several years, and provide shelter to various animals and birds, and also provide fuel, fodder, and timberwood. They function as natural air conditioners, provide fresh oxygen by absorbing pollutants, are used in preparing various medicines, yield rubber and gums. They also regulate rainfall and check soil erosion and pollution.

Classification of trees

According to uses and/or purpose

Foliage trees

Leaves are evergreen and attractive. Most of them can grow in shade. Some of them grow erect. They exhibit architectural beauty and are most suitable for avenues. Some of the foilage trees are as follows:

1. *Alstonia scholaris* (Devil's tree)
2. *Saraca indica* (Sita Ashok)
3. *Azadirachta indica* (Neem)
4. *Ficus benghalensis* (Banyan)
5. *Polyalthia longifolia* (Ashok)
6. *Samanea saman* (Rain tree)
7. *Pinus longifolia* (Indian pine)
8. *Albizia Lebbeck* (Siris)
9. *Pongamia pinnata* (Karanj)

Fig. 4.1: Sita Ashok (Saraca Indica)

Fig. 4.2: Indian pine (Pinus longifolia)

Fig. 4.3: Siris (Albizia Lebbeck)

Fig. 4.4: Karanj (Pongamia pinnata)

- Shady trees: Neem (*Azadirachta indica*), banyan (*Ficus benghalensis*), rain tree, *Swietenia*, Shisham, Silver Oak, etc.
- Erect growing: Ashok, Semal, Christmas tree, Arjun, etc.

Fig.4.5: Silver oak (Grevillea robusta)

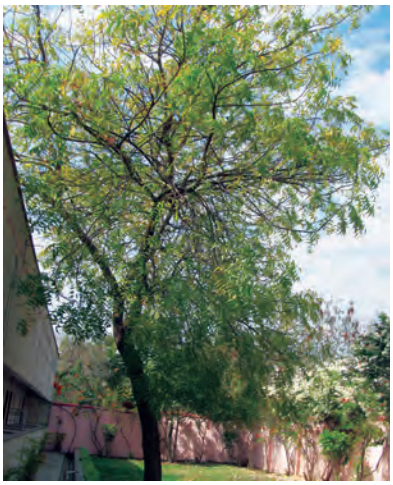

Fig. 4.6: Neem (Aazadirachta indica)

Fig. 4.7: Chrismas tree (Araucaria sp.)

Fig. 4.8: Fountain tree (Spathodea campanulata)

Fig.4.9: Amaltas (Cassia fistula)

Flowering trees

These bear beautiful flowers of different colours in a particular season and beautify the environment. Mostly, these are planted as avenue trees, in gardens and parks, around architectural buildings, along the railway track, on the banks of rivers, etc. These are Cassia species, Bauhinia species, Delonix species, Butea species, *Champa*, Blue Gulmohar, Semal, etc.

1. *Cassia fistula* (Amaltas)
2. *Delonix regia* (Gulmohar)
3. *Jacaranda mimosaefolia* (Blue gulmohar)
4. *Bauhinia purpurea* (Kachnar)
5. *Butea monosperma* (Palas)
6. *Erythrina indica* (Indian coral tree)
7. *Cassia javanica* (Pink Shower)
8. *Spathodea campanulata* (Fountain tree)

Fig.4.10: Pink Shower (Cassia javanica)

Fig.4.11: Kachnar (Bauhinia spp.)

Fig. 4.12: Gulmohar (Delonix regia)

Fig.4.13: Champa (Plumeria sp.)

Fig. 4.14: Palas (Butea monosperma)

Fruit trees

These are grown or cultivated commercially for their delicious and nutritious fruits. These maybe grown in a corner of the garden or near the houses. Such trees are mango, aonla, jamun, tamarind, wood apple, sapota, fig, date palm, coconut, etc.

Medicinal trees

These are the trees grown for their medicinal properties such as Arjun, Bael, Behera, Jamun, Gugul, Neem, Olive, etc.

Fig.4.15: Bottle Brush (Callistemon citrinus)

According to the form of tree (Canopy)

These may have canopy in the shape of round, oval, pyramidal, umbrella type, erect, and weeping or drooping type. Example, Bottle Brush (*Callistemon citrinus*).

According to growth habit

Evergreen trees

These trees show continuous growth. They remain green and do not shed leaves suddenly, hence are called evergreen trees. Such trees are *Dalbergia sissoo, Terminalia arjuna, Polyalthia longifolia, Diospyrus, Saraca indica, Ficus benjamina, Ficus elastica* etc.

Fig. 4.16: Ashoka tree (Polyalthia longifolia)

Fig. 4.17: Weeping fig (Ficus benjamina)

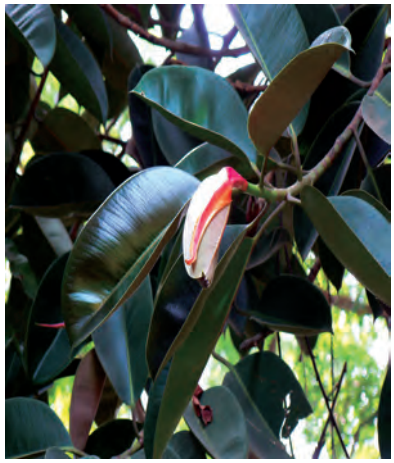

Fig. 4.18: Indian rubber (Ficus elastica)

Deciduous trees

The growth phase is discontinuous. During adverse conditions, each year they undergo a sluggish period when these shed their leaves. When the weather

improves, new leaves start appearing. There are many such trees, such as Banyan (*Ficus benghalensis),* Neem (*Azadirachta indica),* Peepal (*Ficus religiosa).*

Fig. 4.19: Peepal (Ficus religiosa)

Classification of Shrubs According to Use

Shrubs with ornamental foliage

These shrubs are grown for their attractive foliage—brightness (shining), shape, size, colours, texture and variegation, and even some being foetid when crushed. These are used in various features of gardens as hedges, edges, borders, shrubbery, topiary, in pots, etc. Some of such shrubs are *Acalypha*, *Aralia*, *Buxus, Codiaeum*, *Coleus*, *Dodonaea, Dracaena*, *Duranta*, *Euonymus, Lawsonia, Pandanus*, *Putranjiva, Thuja, Golden Juniper* etc.

Fig. 4.20: Golden juniper (Juniperus chinensis)

Fig. 4.21: Thuja (Thuja orientalis)

Flowering shrubs

These shrubs are grown for their shape, size, texture, fragrance, and attractive flowers. They are planted as specimen plants, in pots and bowls, at entrance, in shrubbery border, against the walls, for mass effects in the garden, for making topiary, hedges and knot gardens, and to demarcate one feature of the garden from the other. Some of such shrubs are *Bougainvillea, Cassia, Daedalacanthus, Euphorbia*, *Gmelina, Hibiscus mutabilis, H. rosa-sinensis*, *H. syriacus, Ixora*, *Jasminum*, *Lantana*, *Nerium oleander*, *Rosa*, Peacock Flower, Red powder puff, Night queen, Scarlet bush, Kamini, Mussaenda, Chandani, Tecoma, etc.

Fig. 4.22: Peacock Flower (Caesalpinia pulcherrima)

Fig.4.23: Allamanda (Allamanda cathartica)

Fig. 4.24: Bougainvillea (Bougainvillea sp.)

Fig. 4.25: Gurhal (Hibiscus rosasinensis)

Fig. 4.26: Raktak (Ixora sp.)

Fig. 4.27: Oleander (Nerium oleander)

Fig. 4.28: Red powder puff (Calliandra sp.)

Fig. 4.29: Night queen (Cestrum nocturnum)

Fig. 4.30: Scarlet bush (Hamelia patens)

Fig. 4.31: Kamini (Murraya exotica)

Fig.4.32: Mussaenda (Mussaenda sp.)

Fig. 4.33: Chandani (Tabernaemontana divaricata)

Fig. 4.34: Tecoma (Tecoma gaudichaudi)

Medicinal shrubs

These shrubs, apart from their ornamental value, are also grown for their medicinal properties. Different parts of these plants are used in formulating various medicines and healthcare products. Some of such shrubs are *Adulsa*, *Catharanthus,* Chitrak, Davana, Lavender, *Ocimum,* Sarpagandha, etc.

Holy shrubs

These shrubs are worshipped or their flowers are used for offering to gods and goddesses during religious functions. Such shrubs are *Barleria, Crossandra, Hibiscus rosa-sinensis, Jasminum*, *Nerium, Ocimum*, *Rosa*, *Thevetia*, etc.

Growing of ornamental shrubs

A perennial shrub is a woody plant growing up to a height of 5 m, having many branches arising from the base of the plant. Ornamental shrubs have more variation in their height, texture, and colours of their foliage and flowers.

Uses of shrubs

- They are used for shrubbery borders, ground covers, and specimen plants.
- They can be used for developing hedges around the garden.
- They can be planted in rows as windbreaks.
- They can be grown in pots and arranged in rows as borders.
- They can be trained into topiary to resemble some animals and birds.
- They can be grown for flower production.

Growing Practices for Trees and Shrubs

Soil and climate

For the cultivation of trees and shrubs, soil should be fairly deep, rich in organic matter, and well-drained. However, trees and shrubs can be grown at almost all the places. There are tropical, sub-tropical, and temperate plants. Tropical ones require higher

temperature conditions. Temperate plants are grown in cooler climates. As they are perennial and permanent in habit, seasonal variations have little effect on them.

Manure and fertiliser application

These are trees and shrubs suiting to all the locations and soils. Highly alkaline, salt affected, acidic, and waterlogged soils should be avoided but there are a few species being grown even in such conditions.

Pits of the dimension of one cubic metre should be dug before the planting of trees and of 45 × 45 × 45 cm for shrubs. The soil taken from the pits should be mixed with 25 kg of well rotten farmyard manure in case of trees and 3–5 kg in case of shrubs before refilling. The pit can be drenched with chlorpyriphos at 2 ml/litre before planting to protect against ants and termites. The pits can be exposed to sunshine for atleast a month before planting. The saplings are planted without disturbing the original earthball. If they are in polythene bags, they should be cut open without disturbing the roots. The trees and shrubs are planted and the soil refilled, firmed up, and saturated with water.

Criteria for selection of shrubs and trees

Shrubs and trees for a particular locality, are selected depending on several factors like availability of space, sunlight, humidity, temperature, spread, and height of the shrub or trees, type (for example, flowering or foliage), colour of flower, fragrance, etc. Taller plants require more planting space. *Mussaenda philippica* cannot tolerate extremes of weather and there are many other such shrubs and trees. People like planting shrubs having fragrant flowers, especially the ones such as *Cestrum nocturnum* or various *Jasminum* species near bedrooms, and there are other shrubs which require humid climate for their luxurious growth such as *Gardenia*, *Ixora singaporensis*, etc.

Propagation

Trees and shrubs are propagated through seeds, cuttings, and layering. Most trees and a few shrubs are

multiplied only through seeds such as *Calliandra* sp., *Stenolobium stans, Caesalpinia pulcherrima, Thevetia peruviana,* etc. A large number of shrubs, such as *Hibiscus rosa-sinensis, Achania malvaviscus, Jasminum sambac, Bougainvillea*, *Cestrum diurnum, Cestrum nocturnum*, etc., and a few trees are also propagated by cuttings. Generally, only those are propagated through cuttings where seed-propagation is a problem, and where cutting propagation is a problem, these are propagated even through layering. *Magnolia, Ixora* sp., some species of *Jasminum*, *Mussaenda*, etc., are propagated by layering. The best season for propagation by cuttings is the rainy season.

Season of planting

The time of planting depends on the location and tree type. In general, planting can be done with success during the rainy season. In heavy rainfall areas, planting may be done at the fag end of the rainy season. In mild climate, as of Bengaluru, planting is possible round the year, except during March–May. In the hills, planting is done either in spring or in the summer season.

Maintenance

Immediately after planting, the pits or furrows are watered, and these are watered frequently for a few weeks till they are well established. Frequency may depend upon the plant type, soil texture, and weather condition. Weeds should be removed regularly, otherwise they compete with the main plant for nutrients and moisture. These being woody plants require continuous and careful pruning. Well-grown trees generally do not require pruning but shrubs require it, and it is done just after when flowering is over. These are pruned immediately after flowering where blooming occurs on old canes, but in case where blooming occurs on new canes, pruning is done 45–60 days earlier. Shrubs which are winter flowering in nature such as *Poinsettia pulcherrima* are pruned at the end of the summer season, whereas others are pruned in the winter season.

Procedure

A. Planting

- Dig a pit measuring one cubic metre for trees and 45 cm × 45 cm × 45 cm for shrubs.
- Mix FYM with the top soil.
- Planting should be done in the middle of the pit, with the help of a planting board when the formal planting in line is to be done.
- Provide staking for better establishment.
- Press the soil around the plants by trampling over with your feet while planting.
- Bury the stem underground as much as it was in the nursery.
- Water liberally after planting.

B. Planting of shrubbery

- Make an informal bed. The size will depend as per available space.
- The outline of the bed is to be marked by a thick wet rope.
- Dig the bed to a depth of 45 cm.
- Mix FYM (4–6 kg per square metre) into the soil.
- The shrubs are planted according to their height—the dwarf ones should be in the front, followed by medium ones, and taller ones in the back.
- For a double-faced shrubbery, the same sequence is followed on both the sides by putting the tallest ones in the middle.
- Both foliage and flowering types are planted together.
- Cover the vacant spaces with sub-shrubs, bulbs, or herbaceous plants, such as *Haemanthus*, *Hemerocallis*, *Pilea*, *Zebrina pendula*, *Zephyranthus*, etc.

Topiary

This is an art of cutting or training trees and shrubs or sometimes even certain climbers into specified shapes, initially a feature of Italian gardens, which was quite rampant during the sixteenth and seventeenth centuries, though it originated at the end of the first century BC. It spread throughout Europe from Italy. While making

NOTES

topiary, various formal and informal simple or complex shapes are given such as birds, animals, etc. The plants most suitable for topiary are *Clerodendron inerme*, *Casuarina equisetifolia*, *Duranta plumieri*, *Euonymus, Ficus benjamina*, *F. panda, Dodonaea, Juniperus, Ligustrum, Myrtus, Osmanthus, Phillyrea, Rosmarinus, Vernonia elaeagnifolia*, etc.

Climbers

A climber is a weak-stemmed herb or shrub requiring some post for growing up, mostly having special structures to climb over the supports. They are useful as specimen plants, for making topiary, for screening to create privacy, to cover an area, to screen or conceal the walls or unattractive objects, as a fence, as a background for perennial border especially for small places where they take much less room than shrubs, for covering arches and pergolas, and overall for their green effects and beautiful flowers of attractive colours, shapes, and sizes. These are commonly trained on walls, trees, arches, trellises, and pergolas.

They have weak stems, and therefore are unable to grow straight on their own. These require support to reach an open atmosphere with ample sunlight. Some have modified organs such as tendrils, thorns, roots (haustorium), and rootlets, etc., to climb over a support. Twiners (creepers) differ from climbers in the way that they do not possess such modified organs but twine around the support, cover it, and reach the top. As per the growth habit, these are divided as follows:

(i) *Twiners*

These are climbing plants which twine themselves spirally around another plant or some other object such as *Rosa banksiae alba*, *R. b. lutea*, *Wistaria*, etc.

(ii) *Climbers*

Their special organs are modified leaf-stalk (tendril), hook-like thorns, etc., which provide support to the plants for climbing. Examples of such plants are Epipremnum, Monstera, Philodendron, Raphidophora, Scindapsus, etc.

(iii) *Ramblers*

The plants which do not succeed in their efforts to climb but manage to spread around by supporting themselves on stones or branches. Such plants are *Quisqualisindica, Rosa wichuriana,* etc.

(iv) *Creepers*

The climbers of this group are too weak to rise vertically upwards. They have roots (haustorim) at their nodes for this purpose, such as *Ficus pumila, Parthenocissus,* etc.

(v) *Trailers*

These are similar to creepers, but do not have roots at the nodes.

Categories of climbers as per their use

Climbers vary in their growth habits, some being known for their foliage and some for the flowers, while certain others for both.

Horticulturally, climbers can be classified into different groups based on the growth, flowering and purpose for which they are used:

(i) *Showy flowering climbers*

They flower at a certain time of the year with attractive flowers such as *Adenocalymma aliceum, Allamanda cathartica, Antigonon leptopus, Ipomoea horsefaliae, Passiflora coerulea, Petrea volubilis, Quisqualis indica, Rosa banksiae lutea, Thunbergia grandiflora, T. mysorensis, Wistaria chinensis, Flaming trumpet,* etc.

Fig. 4.35: Flaming trumpet (Pyrostegia venusta)

(ii) *Climbers for foliage*

These are the climbers which are grown only for their beautiful foliage; however, flowers may or may not be of significant value. These climbers are trained to climb over walls or on the strong trunk of the trees. Such climbers are *Ficus repens, Philodendron, Pyrostegia ignea, Scindapsus, Vernonia elaegnaefolia, Indian Ivy,* etc.

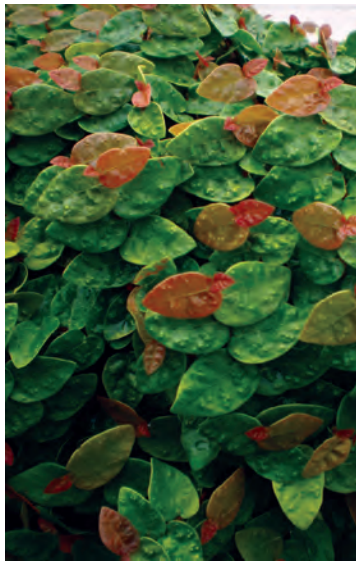

Fig. 4.36: Indian Ivy (Ficus repens)

(iii) *Climbers with scented flowers or foetid foliage*

Under this, the climbers which bear scented flowers are included, such as *Adenocalymma aliceum, Jasminum auriculatum, J. grandiflorum, J. officinale, J.sambac, Rosa banksiae alba, R. moschata,* etc.

(iv) *Climbers for partial shade*

These are the climbers which are grown under filtered sunshine such as *Clerodendron splendens, Petrea volubillis,* etc.

(v) *Heavy climbers*

These climbers have more luxuriant vegetative growth and cover a large area, such as *Antigonon leptopus, Bignonia magnifica Bougainvillea* spp., *Quisqualis indica, Wistaria sinensis,* etc.

Fig.4.37: Coral vine (Antigonon leptopus)

Fig. 4.38: Rangoon creeper (Quisqualis indica)

(vi) *Climbers for hedge making*

These climbers are strong growing and most suitable for hedge making so they are highly amenable to frequent trimming and prunings. Such climbers are *Bougainvillea* spp., *Clerodendron inerme,* etc.

(vii) *Climbers for indoor decoration*

These climbers being shade-loving, are more suitable for pot culture indoors, and such plants are *Asparagus plumosus, Monstera deliciosa, Philodendron* spp., etc.

Growing practices

Soil

Climbers need well-drained soils, preferably a loam. Generally a pit size of 50 × 50 × 50 cm is dug out and the dug out soil is mixed with 5 kg of well rotten FYM. The sapling of the climber is removed from the polythene bag and planted by firming up the soil, immediately followed by irrigation. The climber can be trained on a wall, arch, pergola, or any other support. An annual application of FYM is required.

Propagation

Climbers are commonly propagated by seeds, cuttings, and layering.

List of common shrubs

Flowering shrubs

S. No.	Botanical names	Common names
1	*Allamanda cathartica*	Allamanda
2	*Bougainvillaea spp.*	Bougainvillaea
3	*Caesalpinia spp.*	Peacock flower
4	*Calliandra spp.*	Calliandra
5	*Cestrum nocturnum*	Night queen
6	*Clerodendron spp.*	Clerodendron
7	*Duranta spp.*	Duranta
8	*Hamelia patens*	Scarlet bush
9	*Hibiscus spp.*	Hibiscus
10	*Ixora spp.*	Ixora
11	*Jasminum spp.*	Jasmine
12	*Lagerstroemia indica*	Lagerstroemia
13	*Lantana camara*	Wild sage
14	*Lawsonia inermis*	Mehndi
15	*Murraya exotica*	China box
16	*Mussaenda spp.*	Mussaenda
17	*Nerium oleander*	Oleander
18	*Nyctanthus arbortristis*	Parijatha
19	*Tabernaemontana divaricata*	Wax flower, Chandni
20	*Tecoma gaudi-chaudi*	Trumpet flower

Foliage shrubs

S. No.	Botanical names	Common names
1	*Acalypha* spp.	Acalypha, Chenille plant
2	*Aralia* spp.	Aralia
3	*Codiaeum* spp.	Croton
4	*Eranthemum* spp.	Eranthemum
5	*Phyllanthus*	Phyllanthus
6	*Sanchezia nobilis*	Sanchezia
7	*Clerodendron inerme*	Clerodendron
8	*Duranta plumieri*	Duranta

Fig. 4.39: Croton (Codiaeum variegatum)

List of common climbers

S.No.	Scientific names	Common names
1	*Allamanda cathartica*	Malatilata
2	*Antigonon leptopus*	Coral creeper
3	*Adenocalymna aliceum*	Garlic creeper
4	*Pyrostegia ignea*	Golden shower
5	*Beaumontia grandiflora*	Nepal trumpet climber
6	*Clitoria ternatea*	Clitoria
7	*Clerodendron splendens*	Clerodendron
8	*Ficus repens*	Ficus
9	*Ipomea learii*	Blue morning
10	*Ipomea palmata*	Railway creeper
11	*Jasminium grandiflorum*	Jasmine
12	*Monstera deliciosa*	Monstera
13	*Petrea volubilis*	Purple wreath
14	*Quisqualis indica*	Rangoon creeper
15	*Thunberiga grandiflora*	Thunberiga
16	*Vernonia elaegnifolia*	Curtain creeper

Practical Exercise

Activity 1

Demonstrate the planting of a shrub.

Material Required

Spade, *khurpi*, pots, measuring tape, lime powder, planting board, stake, FYM, insecticide, and shrubs.

Procedure

- With the help of a measuring tape, measure the area of 45 × 45 × 45cm.
- For digging a pit, mark this area with lime powder.
- Dig a pit with the help of a spade.
- Mix FYM with the top soil excavated from the pit.
- Place some fumigant (insecticide) at the base of pit.
- Put a layer of soil excavated from the pit over the fumigant.
- Plant the shrub in the middle of the pit, with the help of a planting board when the formal planting in line is to be done.
- Provide staking for better establishment.
- Fill the pit with FYM and soil mixture.
- Press the soil around the shrub by trampling over with feet.
- Water liberally after planting.

Check Your Progress

A. Fill in the Blanks

1. The group of plants which remains productive for many years is _____.
2. The plants which have soft and succulent stem are _____.
3. Climbers are perennials which have _____ and need support to climb.
4. Medium size bushy plants are known as _____.
5. The plant with well defined single woody stem and branching at crocks is known as a _____.
6. The height of a tree may be more than _____ meters.
7. Continuous growth is shown by _____.

B. Multiple Choice Questions

1. In _____, the growth phase is discontinuous.
   (a) Decidious trees
   (b) Evergreen trees
   (c) Annuals
   (d) None of the above
2. In India, shrubs are mostly planted during the _____ season.
   (a) Rainy
   (b) Winter
   (c) Summer
   (d) None of the above
3. _____ is an art of giving shape of an object to the plants.
   (a) Girdling
   (b) Pruning
   (c) Topiary
   (d) Goottee
4. _____ is not a type of climber.
   (a) Twiners
   (b) Ramblers
   (c) Rubber plant
   (d) Trailers
5. Money plant is an example of a _____.
   (a) Tree
   (b) Shrub
   (c) Climber
   (d) Rambler

NOTES

C. Subjective Questions

1. What are perennials? Give the important characteristics of perennials.

2. What are the different types of perennials?

3. Give the important uses of perennials.

4. Write down the importance of trees.

5. Write down the uses of shrubs.

6. Describe the propagation of shrubs.

7. How can trees be planted?

8. What is topiary work? Name the plants suitable for topiary.

9. What are trees? How are they classified?

10. What are shrubs? How are they classified?

_____

_____

_____

11. What are the different types of climbers? Explain with suitable examples.

_____

_____

_____

12. Distinguish between:
    - climbers and creepers
    - trees and shrubs
13. Give five examples of each of the plants suitable for —
    - Flowering trees
    - Flowering shrubs
    - Flowering climbers
    - Ornamental shrubs
    - Bonsai
    - Indoor plants
    - Palms
    - Ornamental trees

D. Match the Columns

A	B
1. Evergreen tree	(a) *Saptparni*
2. Foliage climber	(b) *Ashok*
3. Medicinal shrub	(c) *Ocimum*
4. Shady tree	(d) *Dalbergia sissoo*
5. Erect growing	(e) *Vernonia elaeagniefolia*

Session 2: Indoor Plants

Indoor (house) plant

A plant which is ornamental for its foliage, flowers or both, and satisfactorily adjusts to the indoor environmental conditions (temperature, humidity, light, and aeration) of a house is known as an indoor plant. These give a sensation of enchantment in patios, porticos, living rooms, bedrooms, bathrooms, stairs, window sills, walls, roof hangings, and rooftops. These are grown primarily for beautification and secondly, for keeping the indoor environment free of pollution. There is a

range of evergreen foliage plants, such as *Aglaonema, Aloe, Asparagus, Aspidistra, Beaucarnea, Calathea, Chlorophytum, Dieffenbachia, Haworthia, Maranta, Monstera, Peperomia, Pilea, Ruscus, Sansevieria, Scindapsus,* etc., and a range of flowering indoor plants such as *Aeschynanthus, Chrysanthemum, Cyclamen, Haemanthus, Hippeastrum, Huernia, Stapelia*, *Zantedeschia,* etc. Many of the slow-growing bamboos, palms and trees adorn the indoors for many years until these attain a particular height. Orchids, bromeliads, herbs, various bulbous plants, cacti, and other succulents are most suitable for indoor growing. However, there should be two to three such sets, out of which, the plants kept indoors should be replaced every week with the set kept outside in the filtered light as every plant whether it is kept indoors or outdoors, requires light for manufacturing its food. Some major benefits of keeping these plants are as follows:

- Such plants beautify the surroundings.
- They remove indoor air pollution, and in turn supply fresh oxygen.
- They absorb dust, various types of odours, and aerosols.

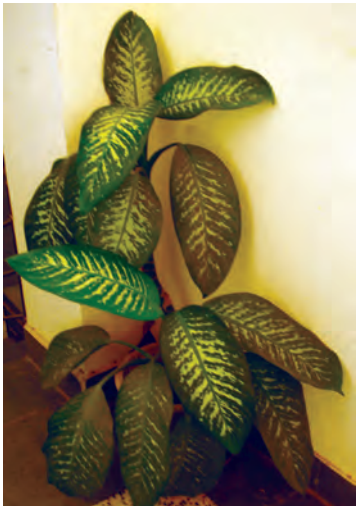

Fig. 4.40: Dumb canes (Dieffenbachia)

Types of indoor plants

Foliage plants

The plants possessing graceful green-coloured or variegated leaves of various shapes are *Aglaonema, Alocasia*, *Anthurium*, *Araucaria*, *Asparagus*, *Begonia rex*, *Brassia actinophylla*, *Caladium, Calathea*, *Chlorophytum*, *Coleus*, *Dieffenbachia*, *Maranta, Pepromia*, *Philodendron*, *Pilea*, *Sansevieria*, *Scindapsus*, *Tradescantia*, *Zebrina pendula,* etc.

Fig. 4.41: Maranta (Maranta arundinacea)

Fig. 4.42: Small-leaf spiderwort (Tradescantia fluminensis)

Fig. 4.43: Money Plant (Scindapsus sp.)

Palms

These (Palmae) are a group of plants mostly with single stem and large leaves, suitable for growing in large halls or rooms. The leaves of these plants present a wonderful variety in form and structure. Some of the useful palms are *Howea belmoreana* (dwarf palm), *Livistona chinensis* (Chinese fan palm), *Neanthe bella* (dwarf palm), *Phoenix roebelenii* (pygmy date palm), Aneca palm etc.

Fig. 4.44: Areca palm (Dypsis lutescens)

Bromeliads

They are interesting epiphytic plants, mostly succulents, with attractively coloured leaves and flowers. Those grown indoors are *Billbergia nutans, Cryptanthus, Till and sia, Pitcairnia balansae,* etc.

Indoor flowering plants

These indoor plants produce beautiful flowers and such plants are *Anthurium, Begonia* (tuberous and fibrous rooted), *Beloperone, Hoya carnosa, Saintpaulia* (African violets), *Rhododendron simsii* (azalea), etc.

Classification of indoor plants

Indoor plants can also be classified into three groups based on the light requirement as high, medium and low. Without sufficient light, carbohydrate manufacturing is minimised but the plants with dark green leaves can survive on a very little light, though certain others require plenty of light. Variegated plants need plenty of filtered sunlight. *Aphelandra, Aspidistra,* and *Ruscus* may not die in low light zone, but may lose their variegation. If there is insufficient light, the plant will produce more chlorophyll at the expense of variegation.

High light requiring plants

Those plants, which require high light conditions, can be placed in the verandah, window edges or one metre away from window. Some of such plants are *Acalypha*, African violet, *Alocacia*, *Aloe vera*, *Anthurium*, *Aphelandra*, *Asparagus*, *Aucuba*, Bamboo, *Begonia*, bleeding heart vine (*Clerodendrum), Buxus*, Cactus, *Caladium*, *Codiaeum, Coffea, Pilea* (creeping Charlie), *Cyclamen*, Devil's ivy, *Dieffenhachia* (dumb cane),

Ferns, *Hibiscus*, *Hoya*, Jade plant, *Kalanchoe*, Palms, *Peperomia*, *Poinsettia*, *Dracaena*, and so on.

Medium light requiring plants

These plants can be placed 1.5 to 3 m away from windows. Some of the plants suitable for such conditions are *Aglaonema*, *Pilea*, *Anthurium*, *Aphelandra*, *Aspidistra, Asplenium, Begonia*, bromeliads, *Calathea*, *Dracaena*, Ferns, *Spathiphyllum* (Madonnalily), *Monstera*, *Pepromia*, *Philodendron*, Rubber tree, *Syngonium*, etc.

Low light requiring plants

These plants can be placed 4 m away from the windows in a bright room, in corners, behind doors, and in very small rooms, and the plants suitable for this condition are *Aglaonema, Aspidistra, Bromeliads* with green leaves, *Calathea, Spathiphyllum, Maranta*, *Philodendron, Ruscus, Syngonium* (geen leaved ones), etc.

Growing Practices

Preparation of potting mixture

Potting mixture comprises of two parts loamy soil, one part leaf mould, $^{1}/_{2}$ part well-rotten manure, and ½ part sand. For ferns and bulbous plants, the mixture should be porous comprising of coarse sand, light garden soil, and leaf mould. Neem cake and bone meal may also be used in small quantities as nutrients.

Potting

For planting the house plants, the pot is filled with the potting mixture leaving 2.5 cm from the brim. Before the filling of pots, pebbles or crocks at holes should be placed to avoid clogging of the drainage hole.

Repotting

For the better growth of indoor plants, repotting or transplanting of the established plants is done once in a year. Repotting is transferring of plants from pots, and planting them in the same or a different pot. During repotting, old potting mixture is replaced by new potting mixture and overgrown roots are removed.

Planting

Planting of deciduous indoor plants is done in February–March, whereas evergreen plants are planted in July–August. Staking (like moss column structures) is also provided depending upon the plant type.

Care and maintenance

House plants require proper care and management throughout the year. Care has to be taken regarding proper:

- watering
- manuring
- disease and insects-pest control
- proper exposure to light

Keeping plants at the same place for a long period of time may result in reduced growth with the yellowing of leaves. Therefore, these require to be placed at regular intervals (7–15 days) by changing their location and sides where these can get ample light during winter and may also have sufficient protection from fierce sunshine in hot summer, *vis-à-vis* ample aeration.

Frequent watering should be carried out during April–June when the plants are in active growth, in comparison to the cold season. Over-watering may lead to the yellowing of leaves and fungal diseases but less watering may restrict plant growth. Therefore, the frequency of irrigation is to be decided depending upon the weather conditions and the type of plant species.

House Plants

Foliage type

Plants having ornamental foliage, though inconspicuous flowers.

S. No.	Botanical names	Family
1.	*Aglonema commutatum*	Araceae
2.	*Calathea lietzei*	Marantaceae
3.	*Dracaena fragrans*	Agavaceae
4.	*Excoecaria bicolor*	Euphorbiaceae
5.	*Maranta arundinacea 'Variegata'*	Marantaceae
6.	*Pandanus baptistii*	Pandanaceae
7.	*Schefflera arboricola*	Araliaceae

8.	*Tradescantia albiflora 'Albo-vittata'*	Commelinaceae
9.	Pothos	Araceae
10.	Croton	Euphorbiaceae
11.	*Acalypha*	Euphorbiaceae
12.	*Diffenbachia*	Araceae

Fig. 4.45: Acalypha (Acalypha hispida)

Fig. 4.46: Aglaonema commutatum

Fig. 4.47: Dracaena (Dracaena fragrans)

Flowering Type

Plants that produce conspicuous and attractive flowers are flowering type house plants.

S. No.	Botanical names	Family
1.	*Acalypha hispida*	Euphorbiaceae
2.	*Begonia semperflorens*	Begoniaceae
3.	*Heliconia humilis*	Heliconiaceae
4.	*Kaempferia pulchra*	Zingiberaceae
5.	*Pachystachys lutea*	Acanthaceae

Ferns

Ferns are valued for their beautiful foliage.

S. No.	Botanical names	Family
1.	*Adiantum capillus*	Adiantaceae
2.	*Blechnum gibbum*	Blechnaceae
3.	*Lygodium giganteum*	Lygodiaceae
4.	*Nephrolepis biserrata*	Oleandraceae (Davalliaceae)
5.	*Platycerium bifurcatum*	Polypodiaceae
6.	*Asplenium nidus*	Aspleniaceae

Fig. 4.48: Bird's-nest fern (Asplenium nidus)

Palms

These have elegant foliage in different forms and patterns, such as *Arenga pinnata, Caryota mitis, Licuala grandis, Phoenix canariensis, Rhapis excelsa, Washingtonia filifera*, etc.

Bromeliads

These have colourful leaves in rosette form as well as attractive inflorescence, such as *Aechmea chantinii, Billbergia nutans, Cryptanthus bivittatus* 'Pink Starlite', *Neoregelia carolina* 'Tricolor', etc.

Bulbous plants

These plants include true bulbs but also the plants that grow from tubers, corms, and rhizomes. These are basically the storage organs.

S. No.	Name	Family
1.	Caladium 'Bleeding Heart'	Araceae
2.	Haemanthus multiflorus	Amaryllidaceae

Succulents

These plants are able to store a lot of water in their tissues either in leaves, stems or rootstocks.

S. No.	Names	Family
1.	*Agave americana parviflora*	Agavaceae
2.	*Beaucarnea recurvata*	Agavaceae
3.	*Dudleya virens*	Crassulaceae
4.	*Furcraea gigantia* 'Medio-picta'	Agavaceae

5.	*Kalanchoe blossfeldiana*	Crassulaceae
6.	*Pedilanthus tithymaloides*	Euphorbiaceae
7.	*Sedum morganianum*	Crassulaceae
8.	*Tradescantia sillamontana*	Commelinaceae
9.	*Yucca filamentosa*	Agavaceae

Juvenile trees

There are certain trees which have attractive leaves in the juvenile phase and can also be used as house plants.

S. No.	Name	Family
1.	*Araucaria cunninghamii*	Araucariaceae
2.	*Cycas circinalis*	Cycandaceae
3.	*Ficus benjamina nuda*	Moraceae
4.	*Juniperus chinensis*	Cupressaceae
5.	*Thuja orientalis*	Cupressaceae

Bonsai

The word bonsai (pronounced as bonsigh) is a combination of two Japanese words *bon* meaning 'shallow pan or tray' and *sai* meaning 'planting', that is tray planting. Originally it is a Chinese art, in China it is called *penzai* or *penzing* which also means 'tray plant' or 'tray scenery'. In Japan, they focus more on the individual tree in pots, while in China, they focus this art towards landscaping. Plants can be grown in shallow containers with restricted growth. In short, the plants (trees, shrubs, and climbers) are maintained in miniature form either singly or in combination with rocks of many forms to show the dignified beauty of an aged tree which has survived the good and bad times of nature for centuries as expressed in the form of trees found in nature. its originating the trunk, the bark and branches. The plants most suitable for bonsai are *Acer palmatum,* Bamboos, *Butea*, *Callistemon, Ficus* spp., *Ginkgo, Juniperus, Lespedeza, Pinus*, *Prunus, Ulmus, Wistaria, Zelkova,* etc.

Classification of bonsai according to the height of the main trunk

Large ones

These include four handed and six handed bonsai measuring above 60 cm to 152 cm in height, and also up to 203 cm with eight handed bonsai (Imperial bonsai).

Medium ones

These are quite popular, and include two handed bonsai and remain within the limit of 30–60 cm.

Small bonsai

It includes either two or one handed bonsai and its height is restricted below 30 cm.

Miniature bonsai

Its height restricts it to 15–20 cm and these are of four types. These types are very difficult to maintain in their true forms, especially the small ones.

Bonsai tools

Shears and scissors, concave pruners, wire cutters and pliers, root hook, knob cutter, brushes, anodised aluminium and annealed copper wires, turn table, watering can, and trays.

Plants suitable for bonsai making

Acacia arabica (black babul), *Achras sapota* (sapota), *Adansonia digitata* (baobab), *Adenium obesum* (desert rose), *Albizia julibrissin* (silk tree), *Araucaria cookii* (new caledonia pine), *Bucida spinosa* (spiny black olive), *Bougainvillea* sp. (bougainvillea), *Buxus harlandi* (Chinese boxwood), *Caesalpinia coriaria* (divi divi), *Salix babylonica* (weeping willow), *Callistemon citrinus* (bottlebrush), *Carmona retusa* (scorpion bush), *Chamaecyparis obtusa* (cypress), *Commiphora mukul* (guggul), *Crassula arborensis* (silver jade plant), *Duranta repens* (golden dewdrop), *Morus alba* (mulberry), *Murraya paniculata* (manokamini), *Elaegnus angustifolia* (thorny silver berry), *Fagus sylvatica* (common beech), *Ficus benjamina* (weeping fig), *Ficus carica* (common fig),

NOTES

Ficus religiosa (pipal), *Ficus retusa* (chilkan), *Gardenia jasminoides* (Cape jasmine), *Hibiscus rosasinensis* (hibiscus), *Inga dulcis* (Madras thorn), *Jacaranda mimosifolia* (blue jacaranda), *Juniperus communis* (common juniper), *Lagerstroemia* sp. (jarul), *Magnolia* sp. (magnolia), *Portulacaria afra* (jade plant), *Punica granatum* (pomegranate), *Putranjiva roxburghii* (child life tree), *Schefflera arboricola* (umbrella plant), *Serissa foetida* (serissa), *Tamarindus indica* (tamarind), *Ulmus parviflora* (chinese elm), *Vitex negundo* (vitex), *Wrightia religiosa* (wrightia), etc.

Making of bonsai

For bonsai making, selection of plant is most important, and then comes the procedure through root pruning, branch cutting, twisting, wiring, and tying to a direction to make these informal or slanting. Generally, non-rusting copper wiring is used. After the objectives are attained, the wires are revoved gently for reuse. These are planted in appropriate and suitable containers or pots filled with the right quantity of soil mixture. Fertiliser is given barely so that these may not attain the luxurious growth but also such that these do not die and so is the case for watering. Any extra growth should be removed immediately.

Practical Exercise

Activity 1

Identify indoor plants.

Material Required

Potted lants or its branches such as Croton, Acalypha, Diffenbachia, Nephrolepis biserrata, Araucaria cunninghamii, Cycas circinalis, Thuja orientalis, etc.

Procedure

- Identify the plants and write their names and importance.

Check Your Progress

A. Fill in the Blanks

1. A _____ is a plant that is grown indoors in places such as residences and offices.

2. The group of plants with a single stem and large terminal leaves are _____.
3. Planting of evergreen indoor plants is done in_____.
4. Japanese words *bon* means _____ or tray and *sai* means _____.
5. In China, bonsai is called _____.

B. Multiple Choice Questions

1. Fingertip bonsai size restricts to _____ .
   (a) 5–7 cm
   (b) 5–10 cm
   (c) 7–9 cm
   (d) 5–12 cm
2. Bromeliads are interesting epiphytic plants and mostly _____ .
   (a) succulents
   (b) hardy
   (c) woody
   (d) None of these
3. Which one of these is not a palm?
   (a) Phoenix roebelenii
   (b) Livistona chinensis
   (c) Howea belmoreana
   (d) Bilbergia nutans
4. Which one of these is not an example of fern?
   (a) Adiantum capillus
   (b) lechnum gibbum
   (c) Nephrolepis biserrata
   (d) Begonia semperflorens

C. Subjective Questions

1. What do you mean by indoor plants? Give their different types.

   _____

   _____

   _____

2. What are palms?

   _____

   _____

   _____

3. What are bromeliads?

   _____

   _____

   _____

NOTES

4. Write down the procedure of making bonsai.

_____

_____

_____

D. Match the Columns

A	B
1. Large bonsai	(a) Above 60 cm
2. Ferns	(b) Bamboo
3. Succulents	(c) Adiantum capillus
4. Suitable for bonsai	(d) Agave Americana parviflora