# UNIT 3 WOODY ORNAMENTALS CLIMBERS

**Structure**

## 3.0 OBJECTIVES

Boys**,** you have study in the previous units about the woody ornamental trees and shrubs.

Now in this unit you will study about woody ornamental climbers. After going through this unit, it will provide you, the following information:

- What are the climbers and how to prepare a list of flowering climbers suitable for various uses ?
- Identification of flowering climbers their flowering colour and how to describe them ?
- How to classify the woody ornamental climbers according to season ?
- Describe the method of propagation, time of planting, care during transplanting, cultural management and manuring including control of insect pests and diseases.

## 3.1 INTRODUCTION

Botanically, plants which have special structure to climb on supports are defined as climber. These special structures may be tendrils, modified leafstalks, rootlets or hook-like thorns. Woody climbers are very important group of ornamental plants and the beauty of any garden can be greatly increased by carefully selecting and planting them in a suitable place. Climbers are very commonly used on arches and pergolas, arbours and pillars, but in cities their utility is enhanced for the purpose of screening the premises from adjacent houses and maintaining privacy. Bare walls can be most effectively decorated by growing colourful climbers on it. Fences and trellis also provide scope for the beautiful climbers to grow and display. According to the growth habit, appearance, suitability and uses, climbers are classified as under:

## 3.2 WHAT ARE WOODY ORNAMENTAL CLIMBERS ?

Those plants which have some special structure to climb on supports, are known as woody climbers. These supporting structures may be, rootlets, tendril, hookery thoms etc.

## 3.3 CLASSIFICATION OF WOODY CLIMBERS

The climbers are classified in to two groups, one on the basis of their uses.

### 3.3.1 Classification on the Basis of Uses

According to the growth habits appearance, suitability and uses, climbers are classified as under.

#### 3.3.1.1 Climbers for Partial Shade

*Trachelospermum jasminoides*, *Beaumontia grandiflora, Clerodendrum splendens, Quisqualis indica* etc. comes under this group.

#### 3.3.1.2 Climbers for Screening

Climbers which grow quickly and show a thick and neat growth are mostly used for screening. Species of *Antigonon*, *Clerodendrum splendens, Derris scandens, Ipomoea spp., Thunbergia laurifolia* can be planted for this purpose.

#### 3.3.1.3 Climbers for Pergolas

For long pergolas in a public garden, usually heavy climbers are grown which include *Allamanda cathartica, Cogea tomentosa, Quisqualis indica and Wisteria sinenses etc. Clerodendrum splendens, Ipomoea horsfalliae, and species* of Jasminum are suitable for porches. Among the different varieties of bougainvillea, Mary Palmer, Thimma, Partha, Dr. R.R.Pal, Formosa and Refulgens, which flower profusely for many months during the year can be trained on porches, *e.g. Clerodendrum splendens, Bougainvillea, Clemetis spp.* etc.

### 3.3.1.4 Climbers for Porches

Selection of a good flowering climber on a sunny porch is important for a colourful display. It adds not only beauty to the house, but also enhances the beauty of the garden in front of building, *Clerodedrum splendens, Bougainvillea Clemetis spp. quisqualis indica* etc. come under this group.

### 3.3.1.5 Other Climbers Which are Used for Different Purpose

*Antigonon alba*, *Asparagus plumosus, Bignonia venusta*, *Bignonia gracilis*, *Ficus repens*, *Jasminum grandiflorum, Tecoma grandiflora*, *Passiflora recemosa*, *Jasminum pubescens*, *Bougainvillea glabra* etc, shrubs these purpose.

## 3.4 CLASSIFICATION OF WOODY CLIMBERS ON THE BASIS OF FLOWERING SEASON

These climbers are classified into three groups according to their flowering season. Some important climbers of this seasons are tabulated as below:

### 3.4.1 Climbers of Spring Season (Table-1)

| Common name | Botanical name | Flower colour |
|---|---|---|
| Nepal trumpet climber | *Beaumontia grandiflora* | White lily like flower |
| Golden shower | *Pyrostegia venusta* | Orange yellow tubular |
| Combretum | *Combretum comosum* | Orange red |
| Derris | *Derris scandens* | Pale rose flower |
| Purple wreath | *Petria volubilis* | Light mauve |
| Heavenly blue | *Thunbergia grandiflora* | Blue colour with yellow shade inside |

### 3.4.2 Climbers of Summer and/or Rainy Season (Table-2)

| Common name | Botanical name | Flower colour |
|---|---|---|
| Adenocalhmma | *Adenocalhmma alliaceum* | Pink-mauve |
| Bird's Head | *Aristolochia elegans* | White with purple veins |
| Kanthali champa | *Artobotrys odoratissimus* | Greenish yellow |
| Trumpet creeper | *Campsis radicans* | Orange trumpet shaped |
| Chonemorpha | *Chonemorpha macrophylla* | Creamy white |
| Clematis | *Clematis spp* | White |
| Combretum | *Combretum comosum* | Orange-red |
| Chabuk chari | *Cryptostegia grandiflora* | Bell shaped funnel reddish purple/pale pink |
| Delima | *Delima sarmentosa* | White |
| Malati | *Echites caryophyllata* | White star like flower |
| Giant honeysuckle | *Lonicera hildebrandiana* | Creamy white |

| | | |
|---|---|---|
| Jhumkolata | *Passiflora spp* | Scarlet, outer filament violet-purple, inner ones united into a tube |
| Purple wreath | *Petrea volubilis* | Star shaped light mauve flower |
| Trumpet flower | *Solandra grandiflora* | Greenish white |
| Potato vine | *Solanum jasminoides* | Star shaped, bluish white flower |
| Madagascar jasmine | *Stephanotis floribunda* | Pure white |
| Bower plant of Australia | *Tecoma jasminoides* | White with pink/red shades |
| Star jasmine | *Trachelospermum jasminoides* | Pure white |
| Chinese wisteria | *Wisteria sinensis* | Mauve/deep lilac |

### 3.4.3 Climbers of Winter Season (Table-3)

| Common name | Botanical name | Flower colour |
|---|---|---|
| Benisteria | *Benisteria laevifolia* | Yellow |
| Clerodendron | *Clerodendron splendens* | Large cluster if dazzling crimson flower |
| Combretum | *Combretum densiflorum* | Scarlet |
| Madhvi lata | *Hiptage bengalensis* | White & yellow flower |
| Japanese honey suckle | *Lonicera japonica* | Tubular fragrant flower, white tinged with purple but turn to yellow with age |
| Bridal bouquet | *Porana paniculata* | Very small, white flower |

## 3.5 DETAIL DESCRIPTION OF SOME IMPORTANT WOODY CLIMBERS

Some important woody climbers are describe in detail as follow:

### 3.5.1 Rangoon Creeper, *Quisqualis Indica*

**Family – Combretaceae.**

It is a charming plant, a native of Burma and Malaysian Archipelago, and thrives well in most parts of India, being frequently cultivated in gardens. Fresh green leaves set off the clusters of pendent pink and white blossoms and the attractive appearance is enhanced by the delicious perfume.The flowers are white or part white and part pink, but later they become completely pink and darken considerably before withering. They appear from March until May and again after the rains. In some parts of India it is constantly in bloom. There is an all-white variety. The

plant is easily raised from layers, cuttings or root divisions and should not be given very rich soil or it could become almost unmanageable. It is wise to cut it back sometimes in the dry season. The black fruit is smooth and pointed, dry and five-winged and about 2.5 cm. in length. A bitter liquid is produced from pulped, unripe fruit and used as a vermifuge. When ripe, the fruit can be eaten, but only in moderation as an excess quickly causes nausea and hiccupping. The leaves, too, are edible and have a warm, pungent taste like radishes.

### 3.5.2 Clerodendron, *Clerodendron Splendens*

**Family – Verbenaceae.**

A comparatively dwarf-growing beautiful climber. The broadly ovate, dark green leaves are very ornamental. The creeper bears large clusters of dazzling crimson-coloured flowers of great beauty during the winter. The creeper needs heavy pruning during rainy season. It is a beautiful climber for the Indian plains. Propagated by separation of root suckers or by layering.

### 3.5.3 Coral creeper, Sandwich Island Creeper, *Antigonon Leptopus*

**Family – Polygonaceae.**

This pretty little creeper is deservedly popular for its lovely sprays of delicate pink flowers. Its original home was South America, but for many years now it has been planted in gardens all over the East where it has established itself as a hardy perennial well suited for covering fences, wall or pergolas - an asset to any garden. It is clearly a widely planted and well loved climber. It is a deciduous plant, the leaves falling in February and for the next few months it presents a very bedraggled appearance unless trimmed and tidied up. But, to make up for this, the two flowering periods are each quite long - all through the rains and for several weeks during the cold season. Then, the fresh green leaves and tangled clumps of globular, pink flowers make a pleasing picture. The long, curled flower sprays bear numerous side stems, many of them springing from the axils of leaves. The colored parts of the flowers are called "perianth segments," which means that there is no difference between petals and sepals in colour or structure, and there is only one series. The leaves are heart-shaped or triangular, pointed and up to 7.5 cm. in length rising from the stalk on short, pink stems, they bend and fold in every direction. There are several varieties. *A. leptopus alba* has white flowers, and *A. amabilis* deep, rose-coloured flowers. Amabilis means "lovely". Which are attractive with its slightly larger flowers and deeper shades of pink. They all thrive in deep well-drained but not too rich and can be propagated by cuttings, layering or seeds.

### 3.5.4 Golden shower, *Bignonia Venusta*

**Family – Bignoniaceae.**

There are many Bignonias, generally known as Trumpet Flowers. It is an extensive climber and, during February, clumps of its brilliant orange flowers may be seen even as high as the tops of tall trees. The flowers appear in dense, drooping clusters between February and April and, although without perfume and with a very short flowering season, the plant is an ornament in any garden, perhaps the most striking and gorgeous climber in the world, framed along a garden fence, up a Palm or over an old tree stump. It remains effective throughout the year. Densely evergreen, the plant never becomes straggly or untidy and during its brief flowering season. The splendid beauty of the honeysuckle-like blooms are a joy to see. The plant thrives well in any good, fibrous loam to which a little manure has been added. Propagation is by cuttings of the old wood set in sand under glass. Another handsome creeper of the same genus is the *Purple Bignonia* (Rignorua purpura), now called *Clystotona binatum,* with dark green, glossy leaves and thick clusters of lovely purple trumpet flowers. These are produced several times a year and are sweetly scented *Saritaca magnifica {Bignonia magnifica)* is a heavier climber, equally vigorous and bearing large, purple-mauve trumpet flowers in great profusion.

### 3.5.5 Railway Creeper, *Ipomea palmata*

**Family – Convolvulaceae.**

One of the commonest yet most useful of the evergreen creepers, refreshing the eve in the hottest weather with its clear, green leaves and delicate, mauve blooms, the Railway Creeper is found in gardens, villages, and on practically every railway station, thus earning for itself its two nicknames. It is the easiest plant to propagate, by cuttings and root division grows quickly and produces its charming flowers every morning of the year. Ipomoeas are of the Convolvulus family, of which there are several hundred climbers, found in most tropical or sub-tropical countries. The flowers are either salver, bell or tunnel-shaped and usually brightly coloured, large and showy. A characteristic of all Impomoeas is revealed by a close examination of flower and bud. In England they were considered a great delicacy long before the introduction of our common potato, and are both palatable and nutritious. It is grown for food all over the tropics.

### 3.5.6 Glory Lily, *Gloriosa Superba*

**Family – Liliaceae.**

It is a herbaceous climber, dying down during the dry season and the tubers remaining dormant until the following rains. Therefore, it is a fragile plant with soft, round, green stems. The bright, smooth leaves are variable in length and breadth, stalk less and often terminate in spiral tendrils which cling tenaciously to anything they touch. They grow singly or opposite, are lance-shaped, broadest in the middle and fold over at the base. The flowers, conspicuous against the fresh green of monsoon growths, change colour as they open and present lovely variations of yellow, orange and crimson. They grow singly on long stems which bend over at the tip. There are several species, differing in the size of the flower and the distribution of the yellows and reds. In the garden they are attractive grown in tubs or pots, trained over a wire, or bamboo ‘balloon’. The Glory Lily is a popular plant throughout tropical Africa, Asia and the hotter parts of America. Propagation by seeds and tubers.

### 3.5.7 Heavenly Blue, *Thunbergia Grandiflora*

**Family – Acanthaceae.**

This extensive and luxuriant climber is a native of Bengal, Assam and Chittagong, but is now found in gardens all over India and Malaysia and also in the tropical U.S.A. It can always be recognized by its dense, green curtain of foliage and large, lavender-blue flowers. There are two varieties; one has smooth leaves and flowers when of quite small size and the other has rough, hairy leaves and a more vigorous growth. There are white and blue varieties which have slightly larger flowers and leaves with more definite lobes. As a garden climber it is better kept under control by means of judicious pruning and can be trained over a trellis or other strong support. Propagation is by seed.

### 3.5.8 Allamanda, *Allamanda Cathartica*

**Family – Apocynaceae.**

Dr. F. Allamanda, a professor of natural history in Leyden gave his name to this very showy plant which has now become one of the most popular of garden climber Cathartica means "purgative". The deep green, shining, evergreen, foliage and waxy, yellow flowers are an attractive contrast and although it is generally considered to be without scent, a faint but rich smell of spices can sometimes be detected. Originally from America, it has been planted so widely in India that it can now be found wild in many parts of the country. It is a fairly large climber, upright, and climbing to a considerable height under suitable conditions. Trained over a screen it forms an admirable hedge or, pruned into a more compact formation in a tub, it makes a cheerful splash of colour on a veranda Its capacity for producing flowers throughout the year is another point in its favour even if there is a period when these are few in number, small and imperfect. The colour is a deep yellow and the petals are streaked with orange. Gardeners in South America grow this species *A. voilacea (A. purpurea)* called the *Purple Allamanda* is an erect, sometimes scrambling shrub, distinct from the other species and varieties in the colour of its flower, which are violet, purple or purple-brown. All like a very sunny position and well-drained soil and should be literally fed with manure. *A. cathartica* and *A. neriifolia c*an be propagated from cuttings but *A. violacea* does not strike easily and is best grafted on to a variety of *A. cathartica.*

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**Check Your Progress Exercise 1**

**Note :** a) Space is given below for answers.

b) Compare your answer with that given at the end of the unit.

1) What are the woody ornamental climbers and their uses ?

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2) How to classify the ornamental climbers ?

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3) Describe the method of planting, time of planting, care during transplanting, cultural management and manuring of climbers ?

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## 3.6 PROPAGATION

The basic objective of plant propagation is to produce off-spring that will be exactly similar to the mother plant. Naturally a successful propagation method is one that will help in the transmission of all characteristics of the mother plant to its off-spring. In nature, plants propagate themselves by seeds and vegetative parts. From time to time civilized men have developed several methods of propagation, which help to preserve and maintain the desirable characters of a plant. Several techniques are used for multiplication of climbers, which include both sexual and asexual means.

### 3.6.1 Sexual Propagation (Reproduction by Seeds)

Propagation by seeds is known as sexual propagation and it is the major method by which many ornamental plants are perpetuated. It is one of the most efficient and widely used propagation methods. Mostly ornamental flowering climbers are being multiplied by the seeds. Some seeds, which have hard seed coats, need external treatments to facilitate quick as well as better germination. A combination of most favourable conditions like water, free supply of oxygen and temperature will help in optimum germination of seeds. Most of the seeds germinate within a week in normal conditions. Age and stage of the maturity of the seeds determine the viability and germinability of the seeds. Seed should be viable so as to produce healthy plant. Seed propagation requires careful manipulation of germination conditions and knowledge of individual seed requirements.

For sowing seeds, wooden flats (30 cm x 30 cm x 8 cm) or earthen pots or pans are used. The soil mixture contains 2 parts soil and 1 part each of sand and leaf mould (or peat); vermiculite can also be used for sowing seeds. Before sowing seeds, soil should be made fine, free of clumps and weeds. The flat or pan should be covered with glass or plastic paper to provide darkness. As soon as the seedlings appear, the glass cover may be removed and pans put in partial shade. The seedlings may be thinned out, if necessary, or pricked out, i.e. to transplant them

to another pan when these develop the first true leaf. After, the seedlings have developed 3 or 4 leaves and attained sufficient height; they may be transplanted in single 7.5 cm pots and moved to bigger pots, if needed. The plants which are propagated by seeds are: *Ipomoea lobata, I. purpurea, Clitoria*, Sweet pea, *Asparagus racemosus* etc.

### 3.6.2 Asexual or Vegetative Propagation

By vegetative propagation is meant the production of a complete plant from one vegetative bud or several such buds. This definition includes all asexual methods such as cuttings, layering, budding and grafting.

#### 3.6.2.1 By Cuttings

This may be defined as a process by which a plant is produced by severing a vegetative portion from the plant and rooting it in a favourable medium under optimum conditions. The plant parts that are used for this purpose are stems and roots. In general, propagation by cutting is the cheapest and the most convenient method and, hence, this is used more popularly to raise new plants. It is probably possible to raise most of the species of plants by one method of cutting or other. The stem cutting of plants with milky sap perform well if their lower ends are allowed to dry or dipped in hot water before planting. The stem cuttings are of three different types according to the maturity of the stem, i.e. hard, semi-hard, soft wood or herbaceous cuttings.

i) **Hard-wood cuttings :** The hard wood cuttings are prepared from the portion of the branch having brown colour and stored food material. The selected branch must be of current year or of past season's growth, about pencil thickness from healthy, vigorous and young plant. Use these branches for making cuttings of 20 to 30 cm in length. The basal cut is given just below a node and the upper cut about 1 cm above the node. Remove the leaves from the basal two-third part of the cutting. Make holes in rooting media. Plant the cutting in the holes. Bury the two-third basal part of the cutting in the holes. Press, soil around the cutting firmly. If the rooting media is dry sprinkle water before making the holes and also sprinkle water on cutting. Keep the pots in a cool, moist place for rooting, sprinkle water as and when necessary. The plant suitable for hard-wood cutting are: Bougainvillea, *Thunbergia grandiflora, Tecoma grandiflora, Ficus repens* etc.

ii) **Semi-hardwood cuttings:** These are taken from previous season's growth or passed the soft wood stage but are not yet mature are referred to as semi-hard wood cuttings. Select healthy, disease-free vigorous plant. Make cutting of 15-25 cm in length. Remove the leaves only from the two-third basal part of the cuttings. As wood of immature cuttings have poor storage of carbohydrates and also of auxins which are essential for rooting. While making the cuttings the basal cut should be given just below the node and upper cut just above the node. The cut ends are treated with a suitable hormone for having good rooting (Rootex No.2 is one of the easily available ones) and are inserted in suitable planting medium which is kept moist. Usually rooting takes place within a month. The plants such as *Bouganvillea, Ipomoea palmata, Vernonia eleganaefolia* etc. are propagated by this method.

iii) **Soft-wood cuttings:** The unripened tips of woody plants such as most of the semi-ornamental. Soft wood cuttings are taken from below a node and

the bottom leaves are removed. Do not remove the leaves except for the part to be buried inside the rooting media. Soft wood cuttings root easily and quickly as compared to hard and semi-hard wood cuttings. It is better to treat the cut end with a suitable hormone such as (Rootex No.1) for inducing better rooting. These are usually planted under mist or during rainy season for achieving best results. The plants such as *Monstera deliciosa, Philodendron* and *Scindapsu*s are propagated by this method.

### 3.6.2.2 Layering

The plants, in which cutting don't produce roots easily, are propagated by layering, rooting is induced in the shoots while they remain attached to the parent plant. Some plants form natural layers while in others rooting is induced.

Layering includes several forms of ground and aerial layering. When rooting is encouraged on the aerial part of the plant after wounding, it is known as air layering or gootie or marcottage. When branches running parallel to ground are utilized, then the method is known as ground layering. Layering is the development of roots on a stem while it is still attached to the mother plant. The root formation on the stem is stimulated by removing a ring of bark or by making a notch which causes an interruption in the downward movement of carbohydrates and auxins from the leaves and growing shoot tips. The material accumulate near the point of treatment and helps in rooting. Root formation depends upon continuous moisture supply, good aeration and moderate temperature around the rooting zone. For the same reason the best results are obtained by these methods during monsoons months (July - September) and spring (Feb - March) from, 1 to 2 years of age.

Layering is divided into two (a) ground layering which may be further divided into many groups such as tip layering, simple layering, trench layering, mound layering or stool layering and compound or serpentine layering and (b) air layering (gootie or marcottage).

i) **Ground layering:** Ground layering is practiced in indoor plants having low or pendant branches. Rooting is induced by notching the under side of the shoot, making a slant cut half- way through, below a node, in up ward direction towards the apex. Alternatively, ringing may be done, i.e. removing a ring of bark 1-1.25 cm wide. Remove the ground soil up to 7.5 to 10.0 cm depth. Bury the injured cane portion in the soil. Put the soil again on the injured portion. If necessary put a piece of stone to hold the cane in its position. Keep the soil wet where cane is buried, for developing the roots. The root will develop within 4 to 6 weeks. Remove the rooted cane and plant it in a cool shady place. Occasionally the rooting is included by wiring i.e. tying a wire around the stem or lateral shoot. Most of the climbers are propagated by this method, and these are: *Antigonon, Passiflora, Clerodendron thomsonae, C. balfouri, Petrea volubilis etc.*

ii) **Air layering:** The plants not having low or pendent branches can be propagated by this method. Select a branch of one or two years of age and about a lead pencil thickness. Wound the branch by gridling just below a node about 25 to 35 cm away from the growing tip. Remove the bark completely from the gridled area (about 2.5 to 4.0 cm). Place handful of moist not wet moss grass around the wounded area. Wrap carefully with a

piece of a clear polythene film of 20-25 cm in size to cover the moss grass completely. Gunny bags pieces of 20-25 cm can substitute for polythene film as a wrapping material. Tie both the ends tightly. In case, wrapping material is gunny bags frequent water is essential. In case of polythene film further watering is not needed. Polythene film permits the exchange of gases (carbon dioxide and oxygen) and low transmission of water vapor. Usually rooting is obtained within a month. Rooting is accelerated by applying root-inducing substance at the point if injury. When the roots are visible through the polythene, the air layers are served from the parent plant and planted independently in a cool shady place. Congea azurea and Combretum have been found to produce much branched root system in air-layers. Eg. *Quisqualis indica, Tecoma jasminoides,* Bougainvillea etc.

### 3.6.2.3 Rootstocks

Proper selection of rootstock is utmost importance when multiplied through budding as they are known to have immense influence on the adaptability of the plant to different soil and climatic conditions, vigor of the plant and so on. Hence, a good rootstock should have fibrous root system, it should have vigorous growth habit and resistant to diseases and frost and should be easily multiplied through cuttings.

i) **Budding:** This is nothing but a form of grafting, the only difference being that instead of grafting a scion twig only a single bud is implanted in the stock. Since budding involves the handling of single bud, some precautions are to be taken. The first point is to select the right type of bud and to conduct the operation in the right season. In ornamental horticulture, mostly 'T' or 'Shield' budding is employed for propagation. The selected rootstock is pruned to about 7-8 cm height and on a pencil thick stem, a 'T' shape cut is made and the bark is slightly loosened to accommodate the selected bud. After inserting the bud the bark portion of the rootstock is covered and tied with film of polythene. The dormant buds get incorporated into the rootstock and sprout to produce new flush.

### 3.6.2.4 Polyhouse

A polyhouse is a framed or an inflated structure with transparent polythene which permits partial control of plant environment and which is large enough to permit a person to carryout cultural operations. Depending upon the environment control facilities and the cost involved in the construction, the polyhouses are categorized as low, medium and high cost. The low cost poyhouse does not have any environment control system. It has only supporting structure, which may either be made of bamboo, G.I. pipe or steel tube. U.V. stabilized 200 micron thick plastic film is normally used for coverage. The modern greenhouses or polyhouses are climate- controlled for cultivation of ornamental crops under protected environment, particularly when it is not possible to propagate the crop in the open due to unfavourable climatic conditions. There is an increasing use of the advanced technology of propagation / growing plants / trees commercially in climate-controlled greenhouses / polyhouses in many countries. The poly greenhouse is less expensive than the one with fiberglass covering. In view of the limitation of space inside the greenhouse, only high value crops/trees may be grown so that the production will be cost-effective. The plants are grown / propagated, either on the ground or in pots/containers placed on benches. In

poly greenhouse management climate-control, labour productivity, efficient energy use, choice of plant, suitable species, production technology and plant protection methods are the major factors influencing the production and quality of the product.

### 3.6.2.5 Propagation of Ornamental Climbers by Different Methods (Table-4)

| S.No. | Propagation method | Name of the ornamental climbrers |
|---|---|---|
| 1. | By seeds | *Ipomea lobata, I. purpurea, Aristolochia grandiflora, A. elegans, Asparagus racemosus, Artabotrys odoratissimus, Asparagus sprengeri, Ipomea pulchella, Asparagus plumosus.* |
| 2. | By cuttings | Bougainvilleas, *Campsis radicans, Thunbergia grandiflora, Tecoma grandiflora, Ficus repens, Monstera deliciosa, Pyrostegia venusta, Bignonia radicans, Quisqualis indica.* |
| 3. | Root suckers | *Camoensia maxima, Campsis radicans, Clerodendron splendens, Quisqualis indica, Clerodendron splendens, Bignonia radicans.* |
| 4. | Ground layering | *Clerodendron splendens, Antigonon, Passiflora, Beaumontia, Banisteria laurifolia, Clerodendron maxima, Allamanda violacea, Adenocalymma alliacea, Thunbergia grandiflorum, Putrea volubilis, Allamanda cathartica, Antigonon alba, Bignonia gracilis.* |
| 5. | Air layering | Bouganvilleas, *Congea azurea, Combretum, Ficus repens.* |

## 3.7 VARIETIES/ SPECIES OF DIFFERENT WOODY CLIMBERS

**3.7.1 Clerodendron :** *Clerodendron splendens, Clerodendron thomsonae.*

**3.7.2 Ipomoea:** *Ipomoea acuminata, I. bona-nox, I. cairica, I. carnea, I. horsfalliae, I.learii, I. paniculata, I. purpurea, I.quamoclit, I. rubro-caerulea, I. tuberose etc.*

**3.7.3 Passiflora:** *Passiflora alba, Passiflora caerulea, Passiflora edulis, Passiflora kermesina, Passiflora laurifolia, Passiflora quadrangularis, Passiflora racemosa etc.*

**3.7.4 Quisqualis:** *Quisqualis indica, Quisqualis pubescens, Quisqualis glabra etc.*

**3.7.5 Thunbergia:** *Thunbergia alata, Thunbergia coccinea, Thunbergia gibsonii, Thunbergia grandiflora, Thunbergia harrisii, Thunbergia mysorensis* etc.

**3.7.6 Antigonon:** *Antigonon leptopus, Antigonon alba, Antigonon aliporensis, Antigonon guatemalense* etc.

**3.7.7 Aristolochia:** *Aristolochia ornithocephala, Aristolochia macrophylla, Aristolochia elegans, Aristolochia grandiflora* etc.

**3.7.8 Bignonia:** *Bignonia purpurea, Bignonia gracilis, Bignonia unguis-cat, L. bignonia speciosa* R. Garh etc.

**3.7.9 Jasminum:** *Jasminum officinale L., Jasminum grandiflorum L., Jasminum Jasminum multiflorum, Jasminum humile L., Jasminum auriculatum, Jasminum paniculatium, Jasminum primulinum* etc.

**3.7.10 Bougainvillea**: Chitra, Formosa, Partha, Refulgens, Golden glow, Lady Mary Baring, Trinidad, Red glory, Mrs Butt, Louis Wathen, Mahara, Roseville's Delight Thimma, Dr. R.R.Pal etc,

**3.7.11 Rose (Ramblers and climbers):** Violtte, Don Juan, Lady Waterlow, Goldy Locks, Golden Showers, Property, Clg. Show Girl, Clg. Crimson Glory, Delhi White Pearl, Cocktail, Iceberg, Josephis, Pinata, Climbing Sadabahar etc.

## 3.8 PLANTING

Like other perennial plants, of climbers can be planted at any time except winter months, early monsoon being the best time. Planting and transplanting are two important operations. The time of planting depends on the climate of the area. Under Indian conditions, the best period is to transplant during the rainy season, provided there is no waterlogging. The pits should be dug before the rains start. While planting a small hole is made at the centre of the pit and the plant is placed with the ball of earth. The plant should not be placed deeper than when it was in the nursery. After planting, the earth around the root should be firmed thoroughly. A basin should be made on the ground around the plant for watering. A pit measuring at least 70 cm in diameter and equal depth is prepared for planting climbers.

### 3.8.1 Density

The planting density depends upon the foliage and branches produced by the climbers. It also depends upon the species, soil and environmental conditions. Climbers are the first consideration in any garden layout and planting of them in view of their permanent nature and longer time taken to attain the ultimate height and spread. They may be planted individually or in groups either in drifts or in straight rows depending upon the garden design. The ultimate height and spread of a climbers must be taken into consideration before planting and the distance of planting should be determined accordingly. The small climbers are usually planted 3 meter apart while the tall ones may require a distance of 4 meter. For planting in groups, the distance can be reduced, depending upon the type of climbers to be grown. The distance also depends on the species of variety and the purpose for which the climbers are used.

## 3.9 WATERING AND MANURING

Watering and manuring encourages growth and flowering of climbers. Bone meal or hoof and horn once or twice in the monsoon will be beneficial to the plants. The quantity to be applied will depend on the age of the plant. The younger plants are given a small quantity of N.P.K. mixture when new shoots arise or after pruning, is suggested and the older plants double the quantity or even more. To get good performance from the flowering climbers should be given F.Y.M. once a year. In times of stress and strain (April to June in northern India) the

climbers should be irrigated. A heavy drenching should be given as mere sprinkling with water is of no use.

## 3.10 WINTERING

Wintering may be considered as an alternative to root pruning. In the hotter parts of India it may not be wise to resort to root pruning. In such places ornamental plants are "wintered". During resting period the water supply to the plant to be wintered is stopped for a few days and the roots are exposed to the sun by removing the surface soil around the trunk. The duration of exposure varies from three to fifteen days depending upon the age, the nature, and the hardiness of the plant. After this the roots are covered with the same soil enriched with farm yard manure and copiously watered.

## 3.11 PRUNING

Pruning of climber is a test of patience and skill for a gardener. The planned removal of branches, twigs, limbs, shoots or roots is termed as pruning. Each pruning is done with a view to increasing the usefulness of a plant. Pruning is a major horticultural practice and skill which can be acquired through experience, observation, and practice. There are some principles of pruning and one of them is to reduce the apical dominance. If the apical shoot is removed the lateral branches will start growing. To keep a balance between vegetative and reproductive growth pruning is done judiciously. The pruning should be done in the right season or the whole purpose will be defeated. A grower will know by experience the time a plant has to be pruned by acquaintance with the flowering and growth behavior of the plant. The plants bearing flowers on the last season's growth are generally pruned immediately after flowering, whereas those flowering on the current season's growth are pruned sufficiently ahead of the flowering season. Plants belonging to the latter category such as those flowering during the summer are pruned either during the winter or early spring (December to February).

## 3.12 STACKING

Stacking may be called an art. It is needed almost with all types of ornamental climbers. The mali often ties a branch to a stake so close that the bark is damaged badly and the growth of the plant affected. The tying material should be first fastened to the stake by a simple knot, then the tie passed over the twig or branch in a loop allowing for growth and yet not sufficiently loose to permit wind play. When large branches are to be stacked a block of wood or bamboo or a pad of coir or gunny fixed to the branch over which the tying rope or wire is drawn, will prevent damage to the bark. Shrubs that are loosely tied or with straggling growth are apt to be injured by high winds; either reduce the growth or else tie them to substantial stakes.

## 3.13 MANAGEMENT OF WEEDS

Weeding is necessary to control the pests and diseases, which might otherwise find a harbour in them. Weed control is usually practiced by mulching, herbicide application and by hoeing the inter row spaces. The weeds deplete moisture and

nourishment from plants. Shortly after cuttings are established carefully scratch the ground to uproot them while they are small. If some are left, they are more easily pulled when the soil is little on the dry side. The beds in which seedlings have been transplanted should be weeded, hoed and watered regularly. After a few weeks of growth the seedlings may be pinched to make them bushy.

## 3.14 INSECT-PESTS AND DISEASES

A plant lover would like to have healthy plants by following proper cultivation practice and keeping the surroundings clean, rather than try to cure them after the appearance of diseases and pests. Regular prophylactic measures such as fungicidal and insecticidal sprays are beneficial and should be followed. Any creature belonging to the animal kingdom and causing damage to shrubs/plants or ornamentals is considered as a "pest". The group of pests such as aphids and thrips make minute punctures in foliage and tender stems and suck the sap, another pest red spider mite, which is actually a mite and not a spider, also feeds on sap. There are several ways of tackling pest attack. One general rule is to follow clean cultural practices. This includes weed-free fields and keeping the surroundings clean by removing plant debris so that the pests do not get any hiding place. The diseases are caused by bacteria, fungi, viruses and mycoplasma like organisms. These can be controlled by crop rotation, elimination of alternate hosts, eradication of infected plant parts, weeds and wild hosts and removal of virus-infected plants. Soil sterilization can be done by repeated digging and harrowing to summer heat and burning of straw or any other combustible material on the surface of the ground, thus raising the temperature of the soil.

## 3.15 ESSENTIAL CULTURAL PRACTICES

Of all the cultural practices, watering is the most important**.** Only one sapling per pit should be put and casualties, if any, should be replaced. All newly planted climbers should be protected from the hot summer winds between March and May. In north India where the winter is severe and the occurrence of frost is common, many of the climbers will need protection against cold. During the summer, drenching of the pits at regular intervals is essential, especially during the first five years of growth. It is beneficial to irrigate older climbers also during the summer and drought. In heavy rainfall areas proper drainage should be provided. Besides protection from adverse climatic conditions, the young climbers will need tree guards for protection against grazing by cattle and goats.

## 3.16 NURSERY RAISING

Site selection is an important task to raise a nursery. For nursery raising, sunny place having fertile deep soil preferably sandy loam with good drainage is ideal. The site once used is left fallow before it is again used, to avoid soil sickness. If the old soil is used, it should be treated with fumigants before planting seedlings. Rotational cropping combined with fallow system prevents several soil problems. To layout a nursery provisions should be made to seedbeds, nursery beds, transplant beds, pot yard, packing yard. The ratio between the surface area for seedbed and transplant bed is 1:20 or 25. Mother trees block is the most important component in the nursery. The climbers should be of guaranteed performance and maintained in healthy condition. A record of the plants propagated from

each of the mother climbers must be maintained by keeping a separate register. There are few factors need to be considered which affect the nursery establishment. These factors include, selection and location and site, soil type, irrigation facilities, labour availability etc.

## 3.17 DIGGING OF PITS

While digging the pits for planting, the good surface soil is kept separately and not mixed with the rest of the soil. Sometimes, it may be necessary to replace the subsoil if it is not of good quality. After digging the pit the soil is returned to the pit mixed with the requisite quantity of manure, the surface soil going on the top.

### 3.17.1 Filling of Mixture and Preparation of Pits

Climbers are hardier than other ornamental plants, but, even then, proper care is needed in transplanting them if they are to grow vigorously. A pit measuring at least 50 cm in diameter and equal depth is prepared for planting a climber. The dug-up soil is mixed with at least 4 to 10 kg of well rotten F.Y.M. or leaf mould, depending on the fertility of the soil, and is then refilled into the pit. The refilled soil is allowed to settle by drenching thoroughly with water. After 3-4 days, work up the top soil in the pit and plant the climbers, keeping the ball of earth around the roots of the plant, to about 5-7 cm deep from the surface. The ball of earth should not be broken but the roots should be loosened and straightened. The injured roots and branches are cut off. The sapling is planted in the pit at the same depth as it was in the pot or nursery.

### 3.17.2 Selection of Plants and After Care

Colour of the flowers is an important factor to consider in the selection of climbers. Primary colours like red, yellow, blue and secondary colours like orange and purple show a very effective display. The power and effect of contrast colours should be kept in mind while planning climbers planting. Although you have an abundance of flowering climbers, selection of climbers for private gardens which should create rhythm, accent, as well as balance in the garden and the dwelling place is rather difficult. One or two small flowering climbers are often adequate selections and planting of climbers should deserve just as much attention as is commonly given to the colour of the building, pool and paved path. Moreover, the height, spread, form, habit (deciduous or evergreen), foliage, colour of flowers, time and duration of flowering, adaptability to local climate and family or personal; preferences should dwarf and medium-tall shrubs should be selected while the tall ones will look more graceful in a larger garden.

## 3.18 MAKING HEDGES/ EDGES/ TOPIARY

### 3.18.1 Hedge

Climbers planted at regular intervals to form a continuous screen is called a hedge. A hedge serves many purposes. A garden hedge can serve the purpose of a compound wall, give shelter from strong gails, ensure privacy, i.e. serve the purpose of a screen, form a background for a floral display such as herbaceous border, as a part of the garden on its own merit, separate one component of a garden from the other. Ornamental hedges are used to demarcate a rose garden or a flower bed or a shrubbery or paths in the garden.

### 3.18.2 Edging

Lining of borders of flower bed paths, lawn, and shrubbery with brick, concrete, living plants, etc., is known as edging. Edging may be formal, made of stone, bricks, tiles, etc., or informal consisting of living plants. There are certain plants which are very suitable for edging purposes and these are known as edge plants.

### 3.18.3 Topiary

Topiary is the shaping of plants in various decorative forms of geometrical shapes (square, cubes, rectangle, dome, globe, half-globe etc.), birds, animals, sculpture, and climbers into ornamental or abstract shapes is known as topiary. Plants which have numerous dark-green foliage and stand frequent clipping and shearing are suitable for topiary work. It takes many years to train and shape plants to desired shapes and sizes. It is possible to attain shapes of different types. Simple shapes such as a globe, sphere, dome, table, chair, cube are not very difficult to achieve, but even figures of birds, or human beings are to be shaped, a lot of patience and perseverance is needed.

## 3.19 HARVESTING

The proper stage of harvesting is important for seeds. The seeds are generally harvested when they are completely ripe on the plant. Some seeds of climber fall from the plant at ripening either due to bursting of the fruit or some other reason such as blowing off due to wind of light seeds. Such seed capsules should be covered with muslin cloth or butter paper bag before ripening, so that in the event of possible shedding these will be collected in the bag. Before harvest, nursery stock should be mature in the sense that the tissues are hardened against water loss and shrinkage. It is common practice to defoliate shrubs some days before they are to be dug out. This can be done by chemical defoliants, by withholding water, and by hand. Live plants intended for transport are sent with a ball of earth around their roots.

### 3.19.1 Grading

There are no standard grades for climbers and their prices are fixed according to the size. Grading is done mainly on size and climbers species. Sometimes the number of lateral branches on main stem is also taken into consideration.

### 3.19.2 Storage/Cold Storage

Seeds are stored in cool, dry place or kept in a desiccators. Seeds needing long stratification are subjected to such treatment immediately after harvest. Living plants are not stored for a long time for obvious reasons. But during the time lag between lifting and packing, these should be kept in shade. Similarly, plants received from nursery are shifted to a shady place and watered. If a considerable delay is anticipated, say, from a few days to one week, the plants are shifted into a cool, humid glasshouse or plastic-house or a mist-chamber.

### 3.19.3 Packing and Transportation

After harvest the seeds are cleaned and stored in closed bottles or tins. Various types of packages are also used for storing seeds. The most common method is to use ordinary paper packets. Paper packets lined with aluminium foil and polythene papers are also in common use. Sometimes, before putting the seeds

in packets, each seed is coated with a pellet to keep it fresh for a longer period. In advanced countries seeds are put in containers complete with compost, fertilizers, etc., and the grower has only to open the lid and water the seeds to get the seedlings. The object of packaging is to deliver the plants or other nursery stock at their destination without rendering them useless in transit. The method of packaging will depend upon the plant and the distance to be covered. Ordinarily bamboo baskets of different sizes and shapes are used and many living plants are transported in these bamboo-matted boxes which may be lined on all sides with polythene sheets to check evaporation.

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**Check Your Progress Exercise 2**

**Note :** a) Space is given below for answers.

b) Compare your answer with that given at the end of the unit.

1) What is propagation; differentiate between seed and vegetative propagation?

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2) Write five name each of the following climbers ?

i) Climbers producing blue flowers

ii) Climbers producing yellow flowers

iii) Climbers producing red or pink flowers

iv) Climbers producing white flowers

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3) What are the important essential cultural practices for maintaining ornamental climbers ?

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## 3.20 LET US SUM UP

In this unit, you have studied about woody ornamental flowering climbers their uses, colour and season wise classification. Propagation of woody ornamental climbers through seed and vegetative such as different types of cuttings, budding, layering, polyhouses, essential cultural practices for maintaining proper growth. Making of hedge and topiary, pruning and watering and care after planting, have been discussed.

## 3.21 KEY WORDS

**Cultivar** : A type of plant or flower that has been developed in cultivation and named by the plant breeder. Cultivar and named by the plant breeder. Cultivar names are enclosed by quotation marks to distinguish them from the scientific names.

**Cutting** : A term usually applied to a stem cutting. This is a section of stem, 7-10 cm long (usually the growing tip), which is used in propagation to root and develop into a new plant.

**Deciduous** : A plant that loses its leaves at the end of the growing season. These plants do not make good house plant as they are not decorative through the resting period. New leaves appear in the spring to replace those lost in the autumn.

**Dieback** : The death of section of stem. This is often caused by faulty pruning.

**Evergreen** : A plant which retains its leaves throughout the year.

**Genus** : A group of allied species. Usually a group of plants (though sometimes only one) which are similar in structure and which most probably evolved from a common ancestor. The genus name always begins with an appear case letter e.g., all ivies belong to the genus Hedera.

**Growing tip** : Also commonly known as growing point, this the tip of shoot from which vigorous new growth emerges.

**Hardy** : A plant capable of surviving outside throughout the year, even in areas where there is the possibility of a winter frost. Aucuba japonica "Variegata" and Fatsia japonica are examples of hardy house plants.

**Leaf mould** : Partially decayed leaves used in potting mixtures to provide nutrients, bacterial activity and an open, free-draining consistency. More correctly known as humus, it may be difficult to buy but can be found under deciduous trees (leaf litter) or made by composting fallen leaves.

**Node** : A stem joint at which the leaves are borne. The node may be notched or swollen and is a point from which the new roots of such plants as Hedera sp. and Philodendron. Are commonly made.

**Pinching out** : Also known as stopping. A form of pruning practiced by gently pulling off, with forefinger and thumb, the soft growing tips of shoots to induce bushiness.

**Rest period** : A period within the 12-month season in which the plant should be allowed to become inactive, producing little or no leaf or root growth.

**Seed** : The fertilized and ripened part of a flowering plant (ovule), capable of germinating and producing a new plant. Seeds range in size from under 1mm to around 20 cm in diameter; most seeds are pea-sized.

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## 3.23 ANSWERS TO CHECK YOUR PROGRESS EXERCISES

**Check Your Progress Exercise 1**

1) Botanically, plants which have special structure to climb on supports are defined as climber. These special structures may be tendrils, modified

leafstalks, rootlets or hook-like thorns. Climbers are very important group of ornamental plants and the beauty of any garden can be greatly increased by carefully selecting and planting them in a suitable place. Climbers are very commonly used on arches and pergolas, arbours and pillars, but in cities their utility enhanced for the purpose of screening the premises from adjacent houses and maintaining privacy. Bare walls can be most effectively decorated by growing colourful climbers on it. Fences and trellis also provide scope for the beautiful climbers to grow and display.

2) The ornamental climbers can be classified into many groups according to their form, types, climatic requirements and the purpose for which they are grown. The important classifications are : seasonal climbers, foliage climbers, climbers for partial shade, climbers for screening, climbers for pergolas, climbers for porches etc.

3) The pit is usually at least 50 cm in diameter as well as in depth, and dug-up soil is mixed with at least 4-10 kg of well-rotten F.Y.M. and is then refilled into the pit. The time of planting will vary from place to place, the best time of planting climber is during the rainy season (July-August) or in February, if water facilities are there. All newly planted climbers should be protected from the hot summer winds, cold, cattle, goats. All climbers should receive one dose of F.Y.M. before rains. The young plants are given 8-10 kg and older plants double the quantity. To get good performance from the climbers, all the flowering climbers should be given F.Y.M. once a year.

**Check Your Progress Exercise 2**

1) The plant propagation is to produce off-spring that will be exactly similar to the mother plant. Naturally a successful propagation method is one that will help in the transmission of all characteristics of the mother plant to its off-spring. Propagation by seeds is the major methods by which many ornamental plants are perpetuated. It is known as sexual method of propagation. It is one of the most efficient and widely used propagation methods, while vegetative propagation is defined as the production of a complete plant from one vegetative bud or several such buds, also known as a sexual method of propagation. This definition includes all asexual methods such as cuttings, layering, budding and grafting.

2) **i) Blue flowering climbers:** *Bignonia purpurea, Ipomea pulchella, Allamanda violacea, Adenocalymma alliacea and Putrea volubilis.*

**ii) Climbers producing yellow colour flower:** *Adenocalymna calycina, Allamanda grandiflora, Banisteria laurifolia, Bignonia gracilis, and Bignonia venusta etc.*

**iii) Climbers producing red or pink colour flower:** *Antigonon leptopus, Bougainvillea spp., Clerodendron splendens, and Quisqualis indica etc.*

**iv) Climbers producing white colour flower:** *Antigonon amabilis, Aristolochia elegans, Beaumontia grandiflora, Zasminum grandiflorum, and Slandra grandiflora etc.*

3) The important components or essential cultural practices for maintaining ornamental climbers are: raising of nursery and selection of rootstock, management of water and eradication of weeds, timely control of insects/ pests and diseases, protection of young plants from adverse weather conditions, filling of mixture, selection of plants and after proper care.