
UNIT 4 CLIMBERS

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4.0 OBJECTIVES

This unit's aim is to describe another important group of foliage plants known as indoor "climber" foliage plants. It is a large group having different genera and their species can be grown successfully as indoor plants, if proper environmental climate will be given to these beautiful foliage plants. The beauty of these climber foliage are its attractive leaves of different shape, size and colours. After reading this unit you will be in position to know:

- What are climber foliage plants to grow indoor ?
- What are their important rolls to decorate interior portion of the house ?
- What are the important factors essential to grow these climbers foliage indoor?
- To study other factors of equal importance cultivation practices, time of irrigation, soil media, use of fertilizer, cleaning of plants foliage, potting, repotting, recycling of the plant and their enemies with control.

4.1 INTRODUCTION

This group of climber indoor foliage plants, have equal importance for interior decoration of house, as other group of indoor plants, as you have studied in earlier units. Most of the indoor climber foliage plant which are grown indoor, these must be acclimatized to the new environment, dry atmosphere, warm climate and reduce light of the interior part of the house, where these foliage plants kept for decoration. If not, there will be some initial setback. If not care it, plant will die.

You will find here, the indoor environment for these climber foliage plant, is slightly different, from other group of indoor plants, cacti & succulents, and semi-woody indoor foliage. These indoor plants need more, light, humidity and temperature, then those of other types of indoor foliage. These indoor plants have very beautiful leaves, in large to small size, type, and in different colour create an attractive feature in the indoor house. Some of the leaves have small petiole while other with large petiole. These indoor climber foliage plants can produce aerial roots, which in turn can be trained on pole, and on moss sticks. All these climber foliage need support, to grow well. The indoor climbers can be used in many striking and different ways; used as specimen plant when display in drawing room, on a wall where enough light is available to produce ever green effect *etc.*

The leaves of these indoor climber plants are evergreen. This character make them very important group of plants, for interior decoration. You will study in detail about some very important indoor climber in the end of this unit with their

different species. All major factors important for their cultivation as indoor. You will be also to known study in this unit with their other factors which are equal importance in indoor cultivation as, cultural practices, irrigation, nutritional requirement, propagation and control of major insect, pests and diseases.

The foliage indoor plants which have climbing stem, with attractive, different type shape and colour of leaves known as indoor climbing plants. This group of plant is very important due to these teachers of foliage.

4.2 WHAT ARE INDOOR CLIMBER PLANTS ?

These indoor foliage climbing plants have some specific features, to separate them from other indoor housing plants.

- The indoor foliage climber plant, does not have erect stem to keep plant erect.
- Their stems need some support-like moss column, pole or wall, to grow plants properly.
- All these indoor foliage climbers produce aerial roots from their nodes; other indoor foliage plants do not have aerial roots.
- These aerial roots help plant to grow on moss-column or wall and keep the stem erect.
- The aerial roots penetrate into the moss-column or pole or wall, and produce small rootlets to fix the plants on moss-column, pole or wall strongly and keep plant stem and its branches erect.
- These aerial root with the help of rootlets, absorb water and nutrient from the moss-column or pole or walls.
- Functions of aerial roots are to give support to the stem of the climber to grow erect on support and collect water and nutrients for plant, healthy growth, other foliage plants do not have this system.
- The climbing foliage plants need more moisture for proper growth, in spring and summer season; and also can grow in more light and temperature then other indoor foliage plants.

4.3 GROWING ENVIRONMENTS FOR INDOOR CLIMBER FOLIAGE PLANTS

The plants we grow in our home come from different type of climatic conditions. Due to this diversity of natural habitat, different plants require different environmental conditions, when grow in indoor.

Having said this, however, the ability to adopt to unfamiliar conditions, is a major reason for the popularity of many common climbing house plants. Generally these plants dislike widely fluctuating temperatures, although a drop of temperature at night is natural and preferred by most of the indoor climbing plant in the house.

There is much pleasure to be derived from growing and looking after indoor climbing plants group. Maintaining, healthy and attractive, these plants do not

involve complicated or time consuming procedures, but just sensible and sensitive attention, to the plants basic needs. To grow, plants need adequate light, at the preferred intensity, and for the right duration, a comfortable temperature, and the essential level of atmospheric humidity, and irrigated, when they need. These plants are generally at rest during winter season. These must be provided, food, till the right kind of growing medium made available to roots. Plants will need repotting on. Every going period (February to March) and other needs of plant are as below:

4.3.1 Light

Light is an essential factor to all indoor foliage plants. The requirement of light to the climbing foliage indoor plant is more than other indoor plants. Without enough light, growth of these plants suffers, and leaves become small, pale, which is the beauty and attraction of these indoor climbers. Healthy growth depends on the process of photosynthesis which produces carbohydrates and is triggered off by the action of light on the green pigments chlorophyll. This pigment is present in all red, purple, brown, green and grey leaves. (Details above process is given in unit 1.3) Variegated-leaves of foliage climber plants, however, are at a disadvantage as the yellow, cream or white section on these leaves contain no chlorophyll *e.g.* sp. of Pothos, Syngonium, Monstera's variegated leaves. For this reason, variegated indoor climber plants generally, need bright light, for longer period, about 12 to 16 hours, if their strong leaf color contrast to be maintained, but not direct sunlight. All these plants needs shaded light. A small, hand-held, photographic light-meter, or camera with a built-in meter, is used to measure the light intensity of interior house. The other factors related to light are described in the unit (1.3) for detail study.

4.3.2 Temperature

All these climbing foliage plants, used in decoration of interior part of house, have a preferred temperature range, in which they thrive well, and usually another that they will not tolerate. The most popular indoor climbing foliage plant like Philodendron, Monstera and Syngonium do best in a temperature range 16-21°C (60-70°F), while Pothos requires slightly higher range of temperature 18-24°C (65-75°F) for good health and growth. To measure the inside temperature range of the room, a **simple thermometer** or a **minimum/maximum thermometer** is used, which measures the daily fluctuation in temperature, by recording the highest and lowest levels of temperature.

These indoor foliage climbers need two type of mini-climate, for its growth. The climbing foliage plant-Pothos and Syngonium-need mini-climate-2 while Philodendron and Monstera like mini-climate-3 are needed inside the house, to grow better. These climates are:

Mini-climate-2, warm, filtered sun : A warm room is one kept at a temperature of 15-21°C. The range preferred by many popular indoor plants, but all plants can tolerate a slightly higher or lower, level for a short time. A normal healthy system prevents temperature following below 15°C.

A room receiving filtered sun may face South, East or West, reduce the temperature inside the room and help plant grow well. But direct sunlight is halted by translucent blinds or curtain, a tall building or leafy, tree outside a window.

Most of the Pothos and Syngonium climber require this micro-climate in the indoor house, for good growth and health of foliage.

Mini- climate-3, Warm, shady : A warm room is one kept at a temperature of 15-21°C the range preferred by many popular house plants, but all plants can tolerate a slightly higher, or lower, level for a short time. A normal heating system prevents temperature falling below 15°C.

A shady position, in our definition, receives no direct or filtered sunlight, but does not have “poor” light (which is too low for healthy plant growth). Plants that like some shade can be grown away from the window in a room that is well-lit, or alternatively, in the window of a room that is not well-lit.

All the indoor climber foliage plants like Philodendron and Monstera, group requires this type of Mini-climate-3, environment inside the house for their healthy growing. (The methods to control the temperature inside house have been describe in unit 1.4 for further details).

4.3.3 Humidity

Humidity means the amount of water vapor contained in the air. It is affected by change of temperature. Warm air is capable of carrying more moisture than cold air, and it will cause water to evaporate from all available sources, including the leaves of indoor plants. The amount of water in air is measured on a scale of “**relative humidity**”. It is an amount of water in the air compared to saturation points at given temperature. 0 %, equals absolutely dry air, and 100 %, equals absolutely saturated air. All these indoor climbing plants need more humidity range 50-65 percent or more. To maintain this degree of humidity, a greater amount of water will need to be present in warm air than the colder air. Monitoring of humidity inside the room, can be measured by a simple meter known as “**humidity meter**” by putting it, inside the house where these plants are kept, from time to time.

4.3.3.1 Sign of Humidity Deficiency

There are number of signs which indicate that a plant is suffering from lack of humidity.

- The leaves of indoor plants may begin to shrivel or show signs of scorching.
- Drying out of leaf tips of indoor climbing plant.
- Plant loses moisture from the stomata of the leaves. Low levels of humidity means that indoor plants lose more moisture through transpiration.
- Drooping of indoor plant leaves.

4.3.3.2 How to Increase Humidity Inside House

There are several ways to increase the humidity of indoor room where foliage climbers are kept.

- i) Portable Humidifier :** You can use these humidifiers, to increase the humidity inside the room, where plants kept, especially in summer. The humidifier work by electric power and can increase humidity according to the requirement of indoor climber plant. They are effective and control

humidity level between 30 and 60 per cent in warm rooms, benefiting to indoor plants.

- ii) **Mist Spraying :** Climbing foliage indoor plants have broad leaves and need more humidity. It can be achieved by using a mist sprayer, to spray the leaves several times in the day, especially in summer season. During summer season when temperature is high, spray the foliage of climbing plants several times a day, but this should not be carried out too late in the day, as all moisture should have dried before night. Moisture, which remains on leaves and leaf joints at night, when the temperature falls, encourage the onset of disease.

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 type of mini-climate is require for Syngonium inside the house ?

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- 2) What are characters of indoor climber plants which differentiate it from other type of indoor foliage plants ?

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- 3) What are the temperature range require by Philodendron and Pothos to grow well inside the house ?

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- 4) How will you increase humidity interior portion of house where “Pothos climbing plant” is kept for decoration ?

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4.3.4 Watering Indoor Climber Plants

Watering is very much essential for all type of indoor climber plant, without it plants will die. Water keeps the plants moist and it is also essential for the process of photosynthesis which manufactures the food for plant. Water absorbed by roots from potting mixture and by aerial rootlets from the supporting column is passed by in all the parts of plants, carrying with it nutrients, vital for food manufacturing process. It charges stems and leaves, and makes them sturdy and turgid, without it, they cannot stay erect. Any shortage of water result in stems and leaves, going limp and drooping. A temporary drought often means that leaves shrivel and go brown at the edges and the tips, making the climber foliage look unattractive.

4.3.4.1 When to Water and how to Water Indoor Climbers?

Knowing, when to water, can be different but, as general rule, plant should be watered inside the house, when they need it. The real problem is to judge when that is. Drooping leaves and limps stems are obvious signs that more water is needed for plant, but you should not water, for such an advance stage to be reached. There is more translucent look, when water is needed. Each climbing plant has its own watering needs, depends on the size, its natural environment and most importantly, the time of the year; actively growing plants need more water. Most of the indoor climber plants need more water, due to large and broad leaves. Moisture gauges are available which record on a dial the exact moisture contents of potting mixture and moss-column or pole, on which climbing plant trial. Reading such as “wet”, moist or “dry” can be seen at a glance, and allow you to act accordingly. **The both, under watering and over watering can cause to damage to the plant.** Now same question arise, how to water the pot plants. The climbing indoor plants are fast growing, need frequent watering once or twice a day and keep moist, to the supporting stalk, because aerial root absorb water from this moist column and pass on water to all the parts of the plants. Give enough water at each watering to barely moisten the potting mixture and moss column throughout. Do this in several times, adding a little water each time. Never give so much water that it appears in any quantity through the drainage hole in the bottom of the pot. When water appears from the drainage hole of the pot, stop watering.

4.3.4.2 Type of Water for Watering Indoor Climber Plants

There are three type of water used to irrigate the indoor climbing plants.

- The tap water is safe to use on most plants. It is always best to apply it when it is tepid, or at least at room temperature.
- Ideally the water should be as lime free as possible.
- Rain water is good, if it is not polluted by chemicals of drain. Do not use water from any ordinary domestic water softener, as this is full of chemicals and cause damage to your plants.

4.3.4.3 Possible Watering Problems

If all the instruction is followed, indoor climbing house plants should receive the right amount of water. However, there can be some problems, if indoor plants are under watered or over watered particularly in winter period.

4.3.4.4 Under Watering and Over Watering

Under watering generally occurs when you apply water “little” or “often” as indoor plants may need a large dose of water to thoroughly sock, its root. The over watering is also create problems. If the potting mixture is kept permanently wet, the pot mixture soon becomes waterlogged and harms the plants. Both under watering and over watering cause problems to indoor plants. These problems are:

i) **Too little water or under watering to indoor plants:**

- Leaves rapidly become wilted and limp.
- Leaf growth slows.
- Lower leaves become curled or yellow in color.
- Lower leaves fall prematurely.
- Leaves edges become brown and dried out.

ii) **Too much water or over watering to indoor plants:**

- Leaves develop soft, rotten patches.
- Leaf growth poor.
- Leaves become curled or yellow in color and their tips become brown.
- Young and old leaves fall at the same time.
- Root rot occurs.

4.3.5 Feeding of Indoor Climber Plants and Form of Fertilizer

With the help of light, water and minerals climbing foliage plants are able to manufacture their own food. By the time a plant is brought indoor, it is likely to need further application for fertilizer for rapid growth. This is because when a plant is potted, the nutrients of potting mixture exhausted in six to eight week and after this time, plants need additional feeding through fertilizer. Fertilizers can be applied in several ways:

- As a concentrated liquid form, added to water for fertigation.
- As granules, applied to the surface of potting mixture.
- As pills or stick of fertilizers, pressed into the potting mixture. For foliage climbers liquid form is the best method, as it can easily be with held during the winter months, when the plant is not growing rapidly. Foliage plants usually live many years in the pots and it is vital that during this time they do not become starved and their growth checked; plant should be fed only when they are growing strongly. It is usually in the month of spring and late autumn.
- Generally feeding should be given after every two week till winter start. The plant remains fresh and healthy.
- If plants are grown under special growth- promoting light indoor, feeding can continue for the healthy growth of indoor climbers.

4.3.5.1 Signs of Hungry in Indoor Climbers

When plant need nutrition, its symptoms appears on the foliage, of the indoor plant. Hunger signs are very slow-or a lack of growth.

- Climber foliage plants stems become weak.
- Leaves become small, pale or yellowing in appearance.
- Few lower leaves start falling. Ideally, plants should not be allowed to reach these extremes before you notice, they need feeding.

4.3.5.2 Feeding Guidelines

Feeding with fertilizer is very sensitive operation and it should be done very carefully. There are few guidelines to feed the plants:

- Fertilizer is not medicine for an ailing plant. If a plant looks unhealthy, examine it for possible cause, including pests and diseases, before feeding it with fertilizer.
- Over feeding can do as much damage as under feeding. Feed only at the strength (or much less) given in the instructions on the fertilizer label.
- Feed no more frequently, then recommended on the label.

4.3.5.3 Fertilizers and its Effects on Indoor Climbers

The major fertilizers are nitrogen, phosphorus and potassium. The trace elements, also called micro-nutrients and are also equally important. Their form of availability, effects and uses are as follows:

Nitrogen (N): Available as Nitrates; it helps in manufacturing of chlorophyll and active leaf and shoot growth; use in all climbing foliage plants, especially at start of growing season.

Phosphorus (P): Available in the form of Phosphate (P_2O_5); it is essential for healthy root production. Useful for all indoor housing climbing plants.

Potassium (K): Available as Potash (K_2O); Useful for healthy formation of leaves and flowers.

Trace elements: Iron, Zinc, Copper, Manganese and Magnesium. These are essential for processes such as photosynthesis and respiration in foliage climber plants.

4.3.5.4 Feeding Checklist

Too little fertilizer : It cause to the indoor climber foliage plants:

- Slow growth, with little resistance to disease or attack of pests.
- Pale leaves, sometimes with yellow spotting.
- Weak stems.
- Lower leaves dropped early.

Too much fertilizer : It cause to the indoor climber foliage plants:

- Wilted or malformed leaves.
- White crust on clay pots and over the surface of the potting mixture.
- Winter growth is lanky while summer growth may be stunted.
- Leaves may have brown spots on their surface and scorched edges.

4.3.5.5 Cleaning of Climber Plants Leaves

The beauty of climbing foliage plants is their leaves. House hold dust spoils the look of leaves and to some extent, clogs the pores of leaves through which they breathe. It also reduces the amount of light which can be used for photosynthesis. The action of cleaning a foliage plant often dislodges the odd pests and may even prevent a real infestation. It can be taken place by:

- If leaves are small can be cleaned with fine brush of painting or mist-spraying.
- If leaves are large, clean with soft muslin cloth or by mist sprays. A wet sponge can also be used for this operation.
- If leaves are hairy, do not clean the plant with damp cloth, as the hairs trap the water and cause rotting. In such cases a soft dry, 1-2 cm paint brush can be used.
- Clean the plant foliage twice a week regularly. Cleaned leaves look more attractive and they allow a plant to function more efficiently.
- Remove away faded and yellowish leaves regularly that are due to old age. Snip of brown tips of leaves with the help of sharp scissors. It is due to dry air, increase humidity.

4.3.5.6 Shifting and Recycling of Indoor Climbing Pot Plants

Shifting and recycling of plant from inside the house, both are very important factors for good health of the plants. A new or old, plant when carry indoor is known as **shifting of plant**. And when a plant from indoor, bring to outside the house is known as **recycling**. There is a set procedure for both the process.

Whenever, a climbing foliage plant bring inside the house, pot plant get different environmental condition inside, in comparison to outside environmental condition. To bring a plant inside the house, has to pass through a set procedure. Indoor plant will be good, if before putting it inside the house, the plant, first should be kept under shade or semi-shade from open field light, for two three days to acclimatized before, then carry it to the inside the house, this whole process is called **shifting plant indoor**.

All the indoor plants should be kept outside, once a week or fortnightly. Bringing the plant outside, first keep the indoor climbing foliage pot under shady place, like verandah or covered balcony or under a tree shade for two three days to acclimatized it in outside environment, before to go out in more light and sun. After two-three days, carry it to more light and sun slowly and slowly. This way your climbing foliage plants remain better and recover their health soon.

If indoor climber plants are brought directly to more light and sun from indoor house, the leaves will scorch and fall soon, and the plants will take a longer time to recover its health; they will need to keep, in the partial shade for a longer period, to recover health. This whole process of shifting of plants from indoor environment to outside environment, is known as **recycling of indoor plants**.

4.4 POTTING MIXTURE FOR INDOOR CLIMBER POT PLANTS

Plants growth and health will depend on proper potting media. Each group of indoor foliage plants needs specific potting mixture, for their proper growth and health. There are two main potting mixtures. One is **soil-based potting mixture**; have heavy texture suitable for large plants and 2nd is peat-based potting mixtures, are lighter and cleaner to handle but they often do not contain any built-in nutrients, so regular feeding is still necessary.

The climbing indoor foliage plants need soil-based potting mixture.

4.4.1 Soil-based Potting Mixture for Indoor Climber Plants

Soil based potting mixtures have a heavy texture, and is suitable for large plants. A very heavy mixture suitable for large specimen of indoor climbing foliage, for large established and top-heavy plants. A suitable home-made mixture, consist of one-third sterilized fibrous loam, one-third medium grade peat-moss, leaf mould or tree bark and one-third coarse sand or fine perlite. A balanced fertilizer should also be added to the mixture.

4.5 POTTING AND PLANTING OF INDOOR CLIMBER PLANTS

The indoor climbing plants purchase from the nurseries, to display indoor, have exhausted their energy available in the pot mixture. Before putting them inside the house, they need repotting, take out its ball from the pot and plant it with fresh soil mixture prepared, to grow properly inside the house. If a young plant is transplant to the new pot first time, used fresh prepared potting mixture, to plant it in the pot.

4.6 TRAINING MATERIALS OF THE CLIMBER POT PLANTS

All the climber plants need to be provided with some kind of support in order for them, to grow upright. All these indoor climber plants produce aerial root to climb as Philodendron sp., Monstera sp., Syngonium sp. and Pothos sp. etc. The support can be prepared with wire netting stuffed, take a plastic rod of desirable height, to make a compact form or pole with sphagnum. It moss is an excellent, sturdy support, and particularly suitable for climbing plants with thick stems and large leaves.

4.6.1 Training of Climber Plants in the House

Climbing plants can be trained up a blank wall, to make it an attractive feature (inside the house) and trained round mirrors, doors and windows to frame them with fresh greenery. To provide support for the plants, striking runs of wire or strong nylon cord between nails or screw eyes, and then attach the plant to the support with plant ties, to help maintain the shape that you want. The small leaves species of Pothos, Philodendron etc. are suitable for this type of decoration, inside the house.

4.6.2 Making of Moss-pole or Column and Training of Indoor Climber Plants

Moss-poles are the best supporting material for climber plants. You can moist it easily; to full-fill the need of water climbing foliage inside the house. The moss-poles can be brought ready made from the nursery shops. But if you make your own with wire netting or nylon netting, you can provide for moister moss-grass for the roots of climbing plants. You can grow a small climbing plants on a moss-pole about a meter or more height. Once it is made, it is very important that you keep the moss constantly moist. If you will not do so, the aerial roots will not grow into it and the plant will not grow well or die.

4.6.3 Building up the Arrangement for Moss-pole

- To form the shape of the moss-pole, take a roll of corrugated paper and wrap chicken wire round it. Cut the wire net or nylon net so that, it is 5-6 cm wider than the paper. Join the two cuts together to form a column shape.
- Cut two length of thin bamboo, thread them through the netting about 3-4 cm from the bottom. Lash them together where they cross each other, and to the wire column, then wedge them into the pot.
- Put a plastic pipe in the centre of the wire column for support and remain erect in the pot.
- Fill the pot, two third full with potting mixture. Start to fill the empty column of chicken wire with sphagnum moss, using a woody stick to pack it together tightly. Continue until full.
- Young plants 3-4 in the pot, for transplantation and fills the pot upto rims. Attach the stems to the pole with wire, bent so that it forms a hairpin shape. Like this attach the stem of pot plant around the column to grow and produce aerial roots for self climbing on poles.
- Water the sphagnum moss and the potting mixture well before putting the moss poles in a pot and put the pot in a warm, shady place. Spray the pole everyday to keep the moss thoroughly moist. After one or two week plants start to grow and produce aerial roots which automatically enter in the moist pole for climbing and start absorption of moisture. Now your plant is ready to put inside the house for decoration.

4.7 REPOTTING OR TOPDRESSING OF INDOOR FOLIAGE CLIMBER PLANTS

Repotting or topdressing should be done at the beginning of the growing period and in spring season. Indoor plants do not always need potting on. If they are not pot bound these will be better in the same pot. If the plants are pot bound i.e. root cover the whole pot mixture, requires repotting. In first case when pots are not pot bound-**topdressing** is done, removes open soil of the pot upto one third part and filled the pot with new soil-based pot mixture, to grow plant well.

When indoor pot plant become pot bound, plant need repotting, into a large size pot, with new pot mixture, take out the ball of the pot plant, prune some surface root before planting in new large pot, put the plant ball in slightly larger pot and fill the pot with new mixture surrounding the ball, plant will grow faster.

4.8 PRUNING AND TRAINING OF INDOOR CLIMBER PLANTS

Indoor house climbers need some training and pruning, to give it proper shape, especially, when they become too large for space available inside the house or become unbalanced. It depends on plant to plant what does it require.

- Spring season is the best time for pruning or training the indoor climbers, when active growth starts in the plants.
- Cut the undesirable branches with sharp cutter to shape the plant when new growth starts in spring season.
- Always cut just above the bud i.e. node, where you want new branch to form, the cut downwards away from the bud, and do not leave a long “snage” as this will be liable to rot.
- Remove all the dried leaves, yellow leaves and dead portion of the plant stem.
- After pruning, spray the plant with light solution of fungicide and insecticide (1 to 2 ml/l. of water) to protect the plants from its enemies which are diseases and insects, when new growth start.

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 do you mean by “under watering and over watering?”

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2) How will you recognize, an indoor climber is hungry, please explain ?

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3) What are the major fertilizer used in climbing pot plants and explain their effect on plants ?

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4) What type of soil mixture, climbing indoor plants need ?

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4.9 PROPAGATION OF INDOOR CLIMBER FOLIAGE PLANTS

Propagation is an important part, growing indoor plants. It is the way to increase your indoor house plant stock. In all the climbing house plants, asexual method of propagation is used. It is also called vegetative propagation method. In climbers vegetative method of stem cutting is used.

4.9.1 Vegetative Propagation by Stem Cuttings

All the indoor climbing house plants are propagated from stem or branch cutting of one kind or another. Stem cut should be made with sharp knife or scissors etc. If possible, water the plant used for stem cutting, about two-three hours before taking the cuttings, as this ensures that stems are fully charged with moisture. After taking the cutting from plant for propagation, first of all, treat the cutting with Bavistin or Captan solution (1-2%), coating the cut end of stem with rooting hormone powder, to promote the early rooting process. Now put the cuttings in a peat-based media or sand etc. After 4-6 week cutting will develop roots and form new plant for plantation.

4.9.2 Hormones that Help in Rooting of the Stem Cuttings

There are several hormones, used for root initiation in new cutting for propagation, these are:

Rootex : It comes under three concentrations:

Rootex-1 : For soft stem cutting.

Rootex-2 : For semi-hard cutting.

Rootex-3 : For hard cutting.

This is in powder form and generally rootex-2 or 3 are used for climbing plants propagation.

Indole Butyric Acid (IBA) : For all type of cuttings rooting. The concentration ranges from 500 ppm to 10,000 ppm.

Naphthalene Acetic Acid (NAA): Also used for all type of cuttings rooting. Its concentration for rooting range is 200 to 1000 ppm.

4.10 THE ENEMIES OF INDOOR CLIMBER PLANTS

The enemies of indoor climber plant are few which attack on plant stem, leaves (young) and root systems. These are:

4.10.1 Plant Infesting Insect and Pest

- i) **Caterpillar and leaf roller:** They roll themselves up in a young leaf, inside a protective web and eat young leaves, stem, and growing point, and ruins the plant foliage *etc.*

Treatment: Individual caterpillar can be packed off by hand and destroyed, but a more serious attack can be controlled by spraying with an insecticide Dimithoate *etc.*

- ii) **Earthworm:** They enter the pot mixture through the drainage hole of the pot; loose the patting mixture and damage the root system.

Control: Soaking the pot with permanganate of potash solution and pick off any worm from that surface. Tapping the pot will cause them to surface.

- iii) **Slugs and Snails:** These will not survive in the home for long, as their presence is soon noticed and they can easily be picked off by hand and destroyed. Both are very fond of juicy stems and can eat away large section of them rapidly. They are most active at night.

Treatment: Protect all indoor climber plants while they are out door by sprinkling slug pellets around them. Renew pellets frequently as rain washes out the chemicals.

- iv) **Mealy Bugs and Root Mealy Bugs:** Mealy bugs resemble white wood-like; they are oval in shape and around 0.5 cm long. They can wrap themselves in a sticky white “wool” which repels water and insecticide solution.

They are stem sap suckers and excrete honeydew. A severe attack can result in leaf fall. Root mealy bugs congregate on the roots and will create little patches of white wool.

Treatment: Systemic insecticides can be effective against mealy bugs, if used repeatedly. For root Mealy bugs, drench the potting mixture with an insecticide at least three times, at two weeks intervals.

4.10.2 Diseases of Indoor Climber Plants

There are few diseases which attack the indoor climber plants. Regular spray with pesticide and fungicide prevent the attack of diseases in indoor climbers.

- i) **Blackleg:** This disease also known as “Black Rot” and “Black Stem Rot”, attack pot plant just where the stem meets the potting mixture, but spreads both upwards and downwards to the root. It rarely occurs, unless the potting mixture is kept too wet for too long and kill the plants. Stem cuttings are liable to be affected plants to save the plant species.

Treatment:

- No Permanent cure known.
- Always use free draining potting mixture.
- Avoid damaging stems and always remove the faded leaves.

Some other diseases are air-borne like mildew *etc.* These diseases caused due to high humidity. These diseases can be controlled by spraying with fungicide twice in a month. The indoor foliage plants remain healthy.

4.11 IMPORTANT INDOOR CLIMBER PLANTS

Indoor climber foliage plants will have a very important place, to decorate your interior portion of houses. These plants need support to grow well, due to this habit, they are known as foliage climbers. All these indoor climbers produce aerial roots, which help the plant to climb on moss column, pole or on wall *etc.*

The leaves of these plants are very attractive, small to large in size, notched, smooth, ovate and in different attractive shade. They are very much suitable for indoors, where more space, light, humidity and temperature occur, than other indoor plants. Some of these important, common indoor foliage climbers have been described here in detail. These are as below:

4.11.1 Pothos (*Epipremnum* or *Scindapsus*)

Commonly called as “Pothos-Vine”, Ivyarum, is represented by more than 50 species. Some of which are grown for their elegant and decorative foliage, quite similar in that of *Monstera* *etc.* Fleshy vine, climbing by rootlets; Juvenile growth with slender stem, and leaves, ovate-cordate, to 10-30 cm long, waxy glossy, bright green, irregularly splotched or marbled yellow or white; mature shoots with stems, green or striped with yellow or white, climbing upto 2-10 meter or more. Some commonly grown species are described below in detail:



- i) ***Epipremnum aureum* Wilcoxii *Scindapsus aureus* (Money plant or Devil’s Ivy or Pothos):** This climber foliage also known as “*Solomon Island’s Ivies*” have yellowish-green leaves, boldly and irregularly marked with yellow colour. They are impressive in indoor hanging baskets, on high shelves or when trained up moss-covered poles or column. Large specimens are best displayed on their own in warm room’s corner or in drawing room *etc.* These are called evergreen foliage climbers.

Climate : These foliage plant grow well under, a room receiving filtered sun may face, south, east or west, reduce the temperature inside the room and help plant to grow well. But direct sunlight is baffled by translucent blind or curtain, tall building or leafy tree outside a window. This type of climate is known as **Mini-climate 2- Warm filtered Sun.** It grows well if this climate is developed inside the house, where this plant is kept for interior decoration.

Size : The plant grows to a maximum upto 2 m long, with 50 cm-1 m spread. Pinch out the growing tips of the plant, to encourage bushy growth.

Feeding : Feed with standard liquid fertilizer every two week in spring and summer.

Irrigation : These plants need more humidity, especially in summer and spring season. Keep wet supporting pole or moss-column by sprinkler, or other means, and sprayed foliage leaves with 2-3 times with mist-sprayer, to keep the foliage wet, it remain fresh and attractive.

Potting : Repot plant every spring, using soil- based potting mixture. If you do not want to move an older plant into larger pot, top-dress instead (as in unit 3).

Insects, pest and diseases : Insect and pest are similar as other foliage plants, controlled by spraying light dose of insecticide or pesticide. Disease may include sometime rotting of foliage and stem, and sometime rotting of stem and root system, occur due to high humidity and irrigation. Treat plant foliage and soil with fungicide to control the disease.

Propagation : It is multiplied with stem cutting, during spring and rainy season (July-August). A mixture of made up sandy loam soil and leaf mould in 1:1 ratio is preferred to put the cuttings are propagation. Before planting the cutting use rooting hormones to early rooting.

Special Points : Water less in winter, need light shade, temperature 18-24 degree Celsius and keep moist and fed.

- ii) ***E. aureum* or *S. aureus* “Marble Queen” :** The white variegated “Pothos” will test the skill of the most accomplished growers. Most of the plants with a large area of white on leaves are a problem, need to display indoors where more filter light for a longer period of day, otherwise white part will dry.

Mini-climate 2 : Warm and filtered Sun is suitable for its growth as described earlier. A temperature over 18 degree Celsius (65 degree Fahrenheit) is needed, particularly in winter. Also it will be necessary to create a humid atmosphere around the plant (this should not be confused with watering the plant to excess). The humid atmosphere can be developed by spraying plant with mist-spraying, 2-3 times in a day. The other simplest way is to provide a large saucer or tray filled with pebbles on which the plant can stand in the indoor house, where it is displayed. The saucer can be partially filled with water, but the leaves should never be above the surface of the pebbles, as it is important that the plant pot should not stand in water. In a warm room such a saucer will continuously give off moisture around the plants. Moist peat surrounding the plant pot is another way to provide moisture; there are numerous other types also to provide moisture to the indoor plants. These plants also need more filtered sunlight as white portion of leaves do not have chlorophyll.

Size : The stem is slow growing and can grow upto 1 to 1.5 m long, with 30-40 cm spread. Pinch out the growing tips of the plant to encourage bushy growth.

Feeding : Feed with standard liquid fertilizer every two weeks in spring and summer.

Irrigation : These plants need more humidity specially in spring and summer season. Keep wet supporting pole or moss-column by mist-spraying or by other means, sprayed foliage leaves, 2-3 times in the day, with mist-sprayer, the foliage will remain fresh and attractive.

Potting : Repot every spring, using soil-based potting mixture. If plant is small and you do not want to move an older plant into larger pot, topdress instead (as in unit-3).

Insect, pest and diseases : These are very few; spraying plant with insecticide and fungicide once in a month if no attack of insects and disease. Plants will remain healthy.

Special point: Water less in winter, need more diffused light, keep moist and fed.

- iii) *E. pinnatum (Pothos)* : Hardy and versatile are capable of growing well under varied set of condition, *i.e.* open, partial, semi shade and placed indoor with ample diffused light together with a warm, moist and humid condition.

4.11.2 Syngonium (*Nepthylis Sp.*)

Its botanical name is *Nepthylis*. It has about 20 species, most of them grown as indoor foliage climber. It is related to Philodendron in habit and leaf forms. These have heart shaped leaves, sometimes lobed leaves, with silver white or green centers. Plant need staking and training on moss column or pole etc; ever green foliage climes, and aerial roots arises from nodes, to inter or cover the wet moss-column, to keep plant stem erect and attractive; thrive well as home plants. Propagated with cuttings in the month of February-March and rainy season (July-August), in sandy loam soil and leaf mould in 1:1 ratio, is preferred for cutting plantation. Some species in detail are described as below:



- i) *Syngonium podophyllum (Emmerold Gem, variegated)* : It is also known as “Imperial white”. These climbing foliage plants are unusual in that the shape of the leaves changes, as the plants matures. Young leaves have three deeply cut lobes but, in older specimens, the leaves have fine lobes. Plant can be trained to climb up on moss-sticks or thin stakes or they can train from a hanging basket. Keep the moss-column moisted, for proper growth. These are evergreen climbing foliage plants. When grow in pot without supports, pinch out the growing tips to encourage bushy growth in pot, to display in group for color contrast.

Mini-climate-2 warm, filtered sun : This climber foliage grows well under Mini-climate-2 warm, filtered sun, as described for pothos size :

Size : The stem can grow upto 2 m height. The spread depends on the support system used.

Feeding : Feed with standard liquid fertilizer every two weeks from spring to autumn.

Potting: Repot in spring using equal part of soil-based potting mixture and leaf mould, but only if the roots have completely filled the existing pot. If you do not want to move an old plant into a larger pot, top-dress instead.

Insect, pest and diseases: These are common as in foliage indoor plants, if anything appear, control it accordingly as given in the earlier units. Spraying with insecticide and fungicides once in a month, the plant remain healthy.

Special points: Water less in winter, need light shade, temp. 18-24°C and keep moist and fed.

- ii) ***Syngonium podophyllum* “White Butterfly”** : Also known as *Nephtytis podophyllum*. A slow growing, evergreen, compact plant with butterfly-like, broad, silver white leaves. Plant can be grown in pot as such without any support or climb as require on moss-column pole etc. A very good climber for interior decoration and in color contrast group growing in pot without support in the house.

These indoor climber required mini-climate-2 for their proper growth as in case of pothos. It create humid atmosphere around the plant by spraying with water or with occasional misting of the foliage with taped water. It requires light shade and temperature 16-21°C (60-70°F) to grow well.

Size: In pot it can grow upto 30-40 cm, but when moss stick support is given, can grow upto 1 m. height.

Feeding: Feed with standard liquid fertilizer every two week from spring to summer as described earlier.

Potting: Repot the plant in spring using equal part of soil- based potting mixture and leaf mould, but only if the roots have completely filled the existing pot. If you do not want move old plant into a larger pot, top-dress instead.

Insect, pest and diseases: The enemies are very few; spraying with any insecticide and fungicide one in a month the plants remain healthy and attractive.

Special points: Irrigate less in winter, provide light shade and temperature range 18-24°C; keep foliage plants moist and fed.

- iii) ***S. angustatum* “Alleo-lineatum”** : Leaf segments of adult phase narrower with medium one largest and usually elliptic; juvenile plant very early producing 3-5 segmented leaves, first leaves in juvenile phase white variegated along midribs and lateral veins, sometimes only margins green but when 3-5 segments then variegated only along midrib. Other cultural practices etc are same as in *S. podophyllum* sp.

- iv) ***S. podophyllum* “Tricolor”** : It has slender stem, leaves, arrow-shaped, 2 to 3 lobed, dark green with palm-green and ivory white variegation.

It is a good indoor climber. It is also good for making hanging baskets for interior decoration, of large houses. The habitat requirements, propagation techniques and cultural need of Syngonium are almost same as applicable to *Epiprenum aureum*. However, potting mixture is prepared by mixing sandy loam soil, leaf mould and well decomposed cow-dung manure in 3:2:1 ratio.

- v) ***S. podophyllum* “Ruth Frass”** : A horticultural selection with distinctly improved variegation over the type. Variegation in this cultivar lasts longs. It is very good for interior decoration.

Other cultural practices are similar as in *Syngonium*. It grows slowly and need support of moss-column; needs high humidity in spring and summer and ideal temperature range is 16-21°C for good growth inside the house.

- vi) *S. podophyllum* “Schott” : Evergreen, arrow head climber, good for interior decoration. Leaf blades of adult phase pedate, glossy, medium green, seven segmented (5-9), distant from each other, middle segment; in juvenile phase leaf blades oblong to ovate, sometimes variegated with silver, cream and white. The other cultural practices are similar to *Syngonium sp.*

4.11.3 Philodendron

It is a beautiful foliage climber for indoor decoration. It have about 275 species. They are grown indoor for their evergreen ornamental foliage.



Philodendron may be mistaken in the gardens and nurseries with *Monstera*. These are attractive, evergreen indoor house plants. Like other climbing foliage, they also need support to grow properly. The aerial roots arise from the node that helps to climb on supports, like moss-column, net column or pole *etc.* The aerial rootlets make its way into moss- stick, and support the plants. With the help of these aerial rootlets, plants also absorb water from the moss-column which helps it to grow fast. Many species growing well in good light but away from direct sunlight. These must be kept watered throughout. The different type of leaves shape are very attractive.

It is propagated by stem cutting, in the month of February to March and July to August. The ideal mixture, to plant stem cutting for propagation is sandy loam soil and leaf mould in 1:1 ratio, for cutting plantation.

Insect, pest and diseases are very few, if you find any one of them, treat them accordingly as described in earlier unit. Some beautiful and attractive species of Philodendron are described in detail as follows-

- i) *Philodendron* “Burgundy” : These large-leaved indoor foliage climbers have bright red leaf stalk and undersides to their leaves. They will flourish if trained around a moss covered pole or column. Large specimens look best on their own, and ideal to display in corner of large drawing room or hall *etc.* where enough light is available in the interior part of the house.

Climate : These indoor climbers grow under a shady position, in our definition, receive no direct or filtered sun light, caused less temperature, inside the room which is not good for healthy growth of some other indoor plants. The plant that like some shade cannot be grown away from the window in a room that is well-lit or alternatively, in the window of a room that is not well-lit. This type of climate is known as Mini-climate 3 Warm, shady:

Size : These plants are slow-growing but will eventually reach a height of 2 m. Canopy is compact, stem-vine red, leaves arrow shaped, base cordate or hastate, about 30 cm long, leathery, deep green with reddish tinge ribe beneath and the young growth burgundy red, petiole winged.

Feeding : Feed with standard liquid fertilizer every two weeks in spring and summer as described earlier.

Potting : Repot the plant in spring using half soil-based potting mixture and half leaf mould, but only if the roots have filled the existing pot. Once plants are in 15-25 cm pots, top-dress instead.

- ii) ***P. scandens oxycardium*** : It is beautiful, evergreen climbing foliage and very good for interior decoration of house. Its leaves are broad heart-shaped, glossy green in color. The leaves are pointed, fleshy and attractively bronzed, when they first appear, but become dark green and leathery with age. They can be trained upon a support, such as moss-covered pole, column, are best to trail. Aerial root arises from nodes, penetrate to moss-columns, to support the plant, and also absorb water and nutrient from the moss-column for good growth. These climbing foliage plants are ideal for warm room without much sun.

Climate : Mini-climate-3 warm, shady is a ideal climate for its proper growth as described earlier.

Size : These climbing plants are fast growing; maximum size is unpredictable but upto 2 m length and a 50 cm spread can be reached. Punch out growing tips to encourage bushy growth of the plant.

Feeding : Feed with standard liquid fertilizer every two week in spring and summer, and once every month in autumn and winter for good growth.

Potting : Repot the plant in every spring, using half soil-based potting mixture (unit-1) and half leaf mould or peat moss. Once plants are in 25-30 cm pots, top-dress instead.

Special points : Stand plant on trays filled with moist pebbles to increase humidity.

- iii) ***Philodendron bipinnatifolium*** : There are numerous philodendron of similar type to this one, all requiring ample space for their radiating leaves once they reach maturity. There are essentially individual plants to be placed on their own rather than as part of a collection. Leaves are glossy green in color and deeply cut along their margins, and held on stout petioles attached to very solid, short trunks. Aerial roots arises from the trunk in time; direct these into the pot soil, when they are long enough, as in older plants. It may be necessary to remove some of these aerial roots, or they can be allowed to trail into a disc of water placed alongside.

It required mini-climate-3, warm, shady, for proper growth as described earlier units. Ample watering is a must, with marginal less, being given in winter. It grows well under the range of temperature 16-21°C (60-70°F).

Feeding: It should not be neglected. Feed with standard liquid fertilizer every two weeks in spring and summer.

Potting: Repot in plant the spring, when potting on, use a half soil-based mixture-half bag mould, add some loam also in the mixture, as these are quite greedy plant. Repotting should be done only when roots have filled the existing pot. If plants are small and in 15-25 cm pots, top-dress instead.

Special points: These plants need space, shade, keep wet and fed regularly.

- iv) *P. domesticum, variegated* : A vine with broad, arrow-shaped dark green leaves, variegated with ceramic yellow blotches. It needs support to climb, like other species. Variegated, indoor climber for large space in the house.
- v) *P. emerald duke* : A very decorative hybrid with large green leaves. Internodes are very short, and good for interior decoration.
- vi) *P. florida* : A slender stem of slightly hairy with soft, leathery, deep green leaves, cut into five pointed main lobes with pale midrib underside is brown red.
- vii) *P. hastatum* : A fast growing vine with broad arrow-shaped, glossy green leaves and rounded lobes. It is good to display as a single specimen indeed. The house, where diffused light available.
- viii) *P. king of spades* : Very similar to 'Red Princess' but with large leaf and more triangular spade-shaped.
- ix) *P. "majesty"* : A very compact plant with spread-shaped leaves of coppery green. Underside vine red and petioles red. The plants look almost black. A very good climber for color contrast display inside the house.
- x) *P. "painted lady"* : A vine with attractively decorated yellow spots on the leaves; petioles red.
- xi) *P. "red princess"* : A slow growing vine with radish tinged, spade-shaped angular leaves, stem and petioles red.
- xii) *P. "royal king"* : A robust climber with broad, thick leathery pale leaves with emerging leaves golden; it is very attractive and good climber for indoor house display.
- xiii) *P. selloum* : A slow-growing which makes it a rosette. Leaves are lobed dark green, ideal for indoor cultivation.
- xiv) *P. "red emerald"* : A vine with long, ruby red petioles and long, cordate dark glossy green leaves, mid rib on the underside red.

4.11.4 Monstera

About 50 species are available in the world. Some are very good for interior decoration of the house. These evergreen climbers, climbing to their supports by aerial roots, produced at each node. These plants are characterized by their broad, dark green, perforated leaves. Requiring stacking, and do well under shaded condition. These attractive indoor house plant can be kept to cover the indoor corners of the house.



It is propagated by stem cuttings, below the node, in the month of February to March and July to August, in the mixture of sandy loam soil and leaf mould in 1:1 ratio. It is preferred for rooting of stem cuttings.

Very few insect, pest and diseases attack to this climbing foliage plants. If you find any one of them, control them with suitable insecticide or fungicide as described under earlier units. Few species of monstera are described below in detail:

- i) ***Monstera Deliciosa*** : These climbing indoor foliage plants are evergreen, have undivided, heart-shaped leaves when young; the characteristics split edges and holes appear with age. Train *Monstera deliciosa* on a moss-covered pole, so that the pencil-thick aerial-roots can be guided into the moss, never cut these roots off as they take in nutrients. The petioles prominent and sheathing, as long as blades, sheath drying early and evanescent, geniculum flattened and winged. Peduncles terminates solitary or fascicled hearing ovate or oblong, boat shaped to 30 cm long, creamy spathe that opens widely after flowering and finally is deciduous; spade to 25 cm long, shorter than the spathe, cylindrical or nearly so, dense flowered, perfect flower above and sterile below, perfect flower with no perianth, stamens-4, ovary 2-celled, 2 ovules in each cell. Berries very small, crowded or formed into a multiple fruit and seed 1-1.3 cm x 5-8 mm, pale green.

Climate : It grow well under Mini-climate-3 warm, shady, as described earlier.

Size : These plants can reach a height in excess of 2.5 m.

Feeding : Feed with standard liquid fertilizer every two week in spring and summer.

Potting : Repot the plant in every spring, using a two-thirds soil-based potting mixture and one-third leaf mould. Once plants are in 20 cm pots top-dress instead.

Special points : Clean older leaves regularly, look attractive. Avoid exposure to direct sunlight; moist roots and moss-column and regular feeding.

- ii) ***M. deliciosa* “Mormorata”** : A mutant with irregular variegation having part of the leave entirely green and other sections marbled cream to greenish-yellow or entirely cream; new growth may revert back to green.

M. deliciosa and *M. deliciosa, Mormorata* are susceptible to high humidity, cause rotting of delicate foliage and roots, avoid humidity and spray with low dose of fungicide to control disease. These plants also attack by scales and mealy bugs- spray with low dose of insecticide to control.

- iii) ***M. oblique*** : It is a long climber, leaves elliptic to oblong-lanceolate, to 20 x 7 cm, apex tapering basally oblique, entire developing large, irregular, rather oval holes in older stage, petioles to 11-12 cm long. Peduncle 7-8 cm long, slender, spandex to 3-4 cm long, few flowered. It is a good climber for interior decoration of large house.

- iv) ***M. standleyana*** : Leaf blade of this climbers are entire very dark green, not perforated, petioles very broadly winged, nearly to blade. In adults shoots stem stout; leaf blades oblong-ovate, plides long. Peduncle commonly grown indoor for juvenile phase when stem slender, leaf blades narrowly oblong-lanceolate.

Habitat requirements, cultural needs, propagation techniques and uses are same as in other above species. It is a good plant to grow in pot for indoor decoration. It should be multiplied only in rainy season to ensure success in rooting of stem cuttings.

Repot the plant in spring or rainy season, if root have completely filled the pot. A potting mixture of sandy loam soil, leaf mould, well rotted cow-dung manure, gravel and brick rubble 2:1:1:1:1 ratio have found good for pot culture. If plant is small, top-dress it, with potting mixture.

- v) *M. deliciosa* “Albo-variegata” : A mutant with large leaves partly rich deep green and other section a contrasting creamy white.
- vi) *M. epipremnoides* : Huge climber; leaf blades ovate to oblong-elliptic, leaves of juvenile shoots smaller, similar in form or more broadly ovate. This stage is good for indoor display of pot.

Check Your Progress Exercise 3

Note : a) Space is given below for answers.

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

1) What method of propagation is used in indoor climber plants ?

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2) What insect harm the roots in the potting mixture of climbing indoor plants?

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3) What mini-climate is essential for pothos and name two species of pothos ?

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4) What are aerial roots and describe their functions ?

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4.12 LET US SUM UP

In this unit, you have studied about the climber foliage plants, use as indoor house plants. A detail description about their habit, need of environment when grown inside the house, have been described here. Their cultivation practices, way of irrigation all the important information have been discussed here. Beside this soil mixture, needed by these plants for their pot its preparation, potting, repotting methods have been also discussed in detail. All these pot plants require some supports to climb, for keeping their stem erect. The propagation method and control of disease and insects have been described in detail in this unit.

4.13 KEY WORDS

- Axel** : The angle between the leaf or leaf stalks and stem from which new leaf or side shoot growth and flower bud arises. Buds find here are known as axillary buds.
- Bud** : A embryo shoot, leaf or an immature flower. A terminal growth bud is situated at the tip of a stem or side shoot, an axillary bud is one find in the axel of a leaf stalk. Growth buds are normally protected from damage and cold by closely overlapping scales or sheaths.
- Cutting** : A term usually applied to a stem cutting. This is a section of stem, 7-10 cm long (usually the growing tips) which is used in vegetative propagation to root and developed into a new plant.
- Leaf** : The energy producing organ of the plant. Light striking the great part of the leaf starts the process of photosynthesis. Sepals, petals, tendrils and bracts are thought to be modified leaves. In most cacti. The stems take over the function of leaves. In foliage climbers leaves are very broad and attractive.
- Pinching** : Also known as stopping of growth. A form of pruning practices by gently pulling off, with forefinger and thus the soft growing tips of shoots to induce bushiness.
- Aerial roots** : Roots that appears at nodes. They are mainly used for climbing but are also capable of absorbing moisture from the air. Many aerial roots , only develop properly if they can grasp a suitable rooting medium such as sphagnum moss e.g. *Philodendron* sp. *Syngonium* sp., *Pothos* sp. and *Monstera* sp. etc produce arial roots for supporting the plant stem or moss-column.
- Node** : A stem joint at which the leaves are borne. The node may be notched or swelon and is a point from which the new roots of such plants as *Philodendron* sp., *Pothos* sp. and *Syngonium* sp. are commonly made.
- Species** : The member of a genus are called species. From its seed each persistently breed true to type in its main

characteristics. A plant's name is made up of at least two parts. The name of the genus and the name of the species *e.g.* Philodendron.

Transpiration : The continual, natural water loss from leaves, this may be heavy or hardly noticeable, depending on the time of day or time of year-factors which affects the relative humidity. Heavy transpiration in warm weather causes wilting which is damaging to the plant.

4.14 FURTHER REFERENCES

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- 5) Singh, A.K. : Flower crop cultivation area management.

4.15 ANSWERS TO CHECK YOUR PROGRESS EXERCISES

Check Your Progress Exercise 1

- 1) Syngonium climbing plant require mini-climate-2.
- 2) All climber foliage plants produce aerial-roots from the node, other type of foliage plants do not have aerial roots.
 - i) These aerials roots help the creeping stem erect.
 - ii) All climber indoor plants stems need some support to grow erect.
This support may be moss-column. The aerial-roots penetrate into-the moss-column to keep climber plant stems erect, while other foliage plants have erect stems.
 - iii) The climbing foliage plants need more moisture, light and temperature to grow proper, then other group of foliage plants.
- 3) Temperature range require by Philodendron climber is 16-21°C (60-70°F), while Pothos climbing foliage plant need slightly higher range of temperature, 18-24°C (65-75°F).
- 4) We can increase humidity inside the house, with the help of portable Humidifier and mist-sprayer, where Pothos plant kept inside the house.

Check Your Progress Exercise 2

- 1) Under watering means, when we apply water to pot plants "little" or often, although plant's requirement is higher for root absorption. The over watering means when we apply more water to pot plant, Although its requirement is less.
- 2) Climbing foliage pot plants stems become weak.

Indoor Plants Including Cacti and Other Succulents

- Leaves become small, pale or yellowing in appearance.
 - Few lower leaves start falling.
- 3) There are three major fertilizer used in the climber foliage plants.

These are:

- i) Nitrogen (N) :** Available in the form of nitrates and it help to the plant in manufacturing of chlorophyll and active leaf and shoot growth.
 - ii) Phosphorus (P) :** Available in the form of phosphate (P_2O_5) and it is essential for healthy root production in the foliage plants.
 - iii) Potassium (K) :** Available in the form of potash (K_2O) and it is useful for healthy formation of leaves and flower.
- 4) Climbing indoor foliage plant need soil-based potting mixture.

Check Your Progress Exercise 3

- 1) Asexual method of plant propagation is used in climbing foliage plants. It is also known as vegetative multiplication method and takes place by stem cutting in climbing indoor foliage plants.
- 2) Earth worm harm the root system in the parts of foliage climbers.
- 3) In Pothos, mini-climate-2 is essential for plants growth. The two species of Pothos are: ‘Marble Queen’ (*Epipremnum aureum*), and ‘Money Plant’ (*Epipremnum aureum* ‘wilcoxii’).
- 4) Aerial root are modified roots, found in climbing foliage plants. There functions are: to climb the plant on moss-column and keep the stem erect; the other function is to absorb the water from the air for the plant.