

# **JOB ROLE – FLORICULTURIST (OPEN CULTIVATION)**

Sector – Agriculture

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PPT's for Class XI



PSS Central Institute of Vocational Education  
Shyamla Hills, Bhopal – 462 013 , Madhya Pradesh, India

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# **UNIT 2: NURSERY MANAGEMENT**

## **Session 2: Growing Media and Nursery Bed Preparation**

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# Session Objectives

The student will be able to :

- Describe growing media and its types.
- Demonstrate nursery bed preparation and its importance.
- Explain protection of seedling .

# Introduction

The material in which plants grow in a pot is known as potting material and is commonly called the 'growing medium' or 'potting medium'. The selection of the type of potting material is important as the growth of plants completely depends on it.

The main function of the growing medium is to supply nutrients, air and water to the roots of the growing plants. It supports the plant physically and holds it in an upright position and allows growth against the gravitational force.

# Types of Growing Media

Different types of growing media are used for the propagation of plants *viz.*

**Garden soil:** Light and sandy soils are ideal growing media, while loamy, silt or clayey soils are not preferred due to poor aeration and stickiness.

**Sand:** Large particle size makes this medium more porous, aerated and well-drained. The water-holding capacity of this medium decreases with an increase in the size of particle.

# Types of Growing Media

**Compost:** It is decomposed organic matter used with soil. Dropped leaves, twigs, grass clippings, cattle feed waste, and farm animal excreta are some of the common ingredients that are used for the preparation of compost.

**Sphagnum moss:** It has excellent water-holding capacity and can hold water many times its weight. It is commonly used as rooting medium in air layering.





# Types of Growing Media

**Peat:** Peat consists of residues from a marsh swamp. It comprises some organic nitrogen. It helps in fast vegetative growth.



**Coir peat:** It is obtained from coir fibre dust. It has a high water retention capacity. It is acidic in nature and has a pH of about 5.0.





# Types of Growing Media

**Vermiculite:** It is chemically hydrated magnesium aluminium iron silicate. It is porous and light in weight. It has a good water-holding capacity.



**Perlite:** It is a natural mineral of volcanic origin, which is light weight. The pH is usually neutral to slightly alkaline.



# Types of Growing Media

## Saw dust:

These are the by-products of saw mills. It is easily available and cheap. It is poor in nutrient content but can be used after the addition of nitrogen.



# Potting Mixture

For potting of rooted cutting and young seedlings: 1 or 2 part sand + 1 part loamy soil + 1 part peat moss or leaf mould.

For potting general container grown nursery stock: 2 part sand + 4 part loamy soil + 2 part peat moss or leaf mould + 1 part well rotted FYM.

# Nursery Bed and Its Importance

A nursery bed is a well-prepared piece of land used for raising seedlings or rooting planting material.

- Due to the small size of a plot, it becomes convenient to look after the germinated seeds and the coming seedlings.
- Favourable conditions can be provided efficiently in a relatively small area.
- Precautionary measures against diseases and pests can be undertaken easily.



# Nursery Bed and Its Importance

- Raised bed avoids water stagnation and provides aeration to roots, enabling their fast growth and better establishment of seedlings.
- Due to intense care, the percentage of seed germination improves.
- Seed wastage due to washing away and wrong placement is checked.

# Site Selection for Nursery

- **Location:** Ideally, a nursery, should be located in a pollution-free environment. It should be away from brick kilns, smoke emitting industries and heavy traffics. Non-concrete roads deposit a lot of dust on plants. It must be ensured that adequate sunlight is available in the nursery.
- **Topography of land:** The nursery site must be even to facilitate intercultural operations. If it is undulating, it must be levelled.



# Site Selection for Nursery

- **Soil:** It must be preferably loam or sandy loam with large quantity of organic matter. The pH of the soil needs to be slightly acidic to neutral and must not be alkaline or saline.
- **Water:** Quality water in adequate quantity must be available at the site for irrigation.
- **Drainage:** The nursery site should be free from waterlogging.

# Site Selection for Nursery

- **Transportation and marketing:** The nursery site should be connected with approach roads or railway. It would be convenient to locate the nursery near a market.
- **Labour:** As nursery work is labour-intensive and requires skilled labour, the availability of skilled labour in the vicinity is important.
- **Protection from wind and animals:** The nursery must be protected by a strong fencing to avoid grazing animals and thieves. Suitable plants are planted as windbreak in the south-west direction to avoid losses from strong wind.

# Preparation of Nursery Bed

Nursery beds can be prepared in three ways.

## Sunken beds

- This type of nursery bed is prepared in dry and windy areas.
- As the name suggests, a sunk of 10–15 cm deep is prepared from the ground level.
- Sunk facilitates the deposition of irrigation water or rainwater for longer time.
- In areas facing water scarcity or shortage, this type of bed helps to conserve moisture.
- Sunken bed provides protection to the seedlings during heavy winds.

# Preparation of Nursery Bed

## Flat beds

- These are prepared on the surface of land to the field level.
- These are made in nursery for raising seedlings during summer and winter season.
- Mark an area for the preparation of a flat bed. The surface of the marked bed is dug off. Make it fine and loose.
- Manure, FYM or compost is incorporated according to the size of the bed. Some pesticide, like phorate 10D, is also added to avoid termites.
- Seeds after treatment with suitable fungicides, generally, thiram @3g/kg, are sown to check soil-borne infections.

# Preparation of Nursery Bed

## Raised beds

- In this type of a nursery bed, soil is raised to a height of 15–20 cm above the surface. Hence, it is called ‘raised bed’. These beds are preferred during the rainy season to avoid water stagnation.
- The surface of the soil is dug out and brought to fine tilth. Then, the soil all around the bed is pulled over to raise the surface.
- This automatically creates a trench around the bed, which is later used for irrigating the bed. Manure and fertilisers are added at this time. These beds are also enclosed with bunds.

# Preparation of Nursery Bed

## Raised beds

- The width of the bed is one metre to facilitate intercultural operations and the length may vary according to the slope of soil.
- Spacing of 30–50 cm is kept between two rows of the bed to facilitate intercultural operations.
- Treated seeds are sown width-wise in rows or sometimes by broadcasting method. Initially, these beds are watered with sprinkling water or using a watering can, so that the seeds sown are not dispersed.
- Once the seedlings are well-rooted and reach the ground level, the bed can be irrigated through trenches of the bed attached.



# Precautions to be Taken During Preparation of Nursery Beds

- Nursery bed should be prepared in fertile soil rich in organic matter content with good drainage and aeration. Soil having more water retention capacity does not need frequent irrigation.
- Excess of irrigation in sunken or flat bed may lead to rotting of seeds, seedlings and damping-off incidence.

# Precautions to be Taken During Preparation of Nursery Beds

- Soil-borne infections of nematodes, insects pests and pathogens may be avoided by treating the soil.
- Generally, the width should not be more than one metre and the length should be according to the slope of the soil so that when irrigated water reaches each corner of the bed, the whole bed gets irrigated.

# Precautions to be Taken During Preparation of Nursery Beds

- Seedlings are tender and succulents and are prone to heat shock, so the beds should be prepared in the site receiving partial shade. In tropical and subtropical India, direct sunlight facing site should be avoided.

# Application of Manure and Fertiliser

## Manures

It releases nutrients gradually. When applied, manures are likely to fulfill the leached amount of nutrients from the soil over a period of time. Besides this, it improves soil texture, which improves drainage and aeration. It is, therefore, recommended to thoroughly mix rotten Farm Yard Manure (FYM) at the time of land preparation. During the preparation of nursery beds, the soil is thoroughly mixed with 5–10 kg of rotten FYM per square metre area.

# Application of Manure and Fertiliser

## Fertilisers

**1. Basal application:** Application of fertiliser at the time of nursery bed preparation and/or at sowing of seeds is called 'basal application' or 'basal dressing'. In this method, fertilisers are spread uniformly across the nursery bed and mixed with soil. This method is suitable for phosphatic and potassic fertilisers.

**2. Top dressing:** Broadcasting of fertilisers, particularly nitrogenous fertilisers, in readily available form to growing plants in standing crop is called 'top dressing'.

# Application of Manure and Fertiliser

**3. Foliar feeding:** Only nutrients, like nitrogen, or micronutrients can be applied through foliar application. If a crop suffers due to deficiency of micronutrients (Fe, Mn, Zn and Cu) deficiency symptoms appear on plants, it can be corrected by foliar feeding.



# Protection of Seedling

## Soil treatment:

The planting medium used for the nursery must be free from infections or infestations. Different methods adopted for soil treatment are as follows:

- **Solarisation of soil:** In this method, temperature of the soil or medium is raised so high ( $47^{\circ}\text{C}$  and above) that infested or incubated pests get controlled or destroyed. It is, generally, followed in tropical and subtropical India, where the Sun is too hot during summers.

# Protection of Seedling

## Soil treatment:

- **Steam treatment:** This method is followed in advanced countries and is not common in India. The nursery bed is covered with polythene sheet to make it airtight. Hot steam is supplied mechanically for at least 4–6 hours continuously to kill the pests.
- **Chemical treatment**
- **Formalin:** Sterilisation of the soil of nursery bed is carried out at a dilution of 0.25%. Beds of desired size are prepared and diluted solution of formalin is drenched at the rate 4–5 litres per sq m area.

# Protection of Seedling

## Soil treatment:

**Formalin:** The poisonous fumes penetrate the soil and make it germ-free. The emitting fumes can be retained at the site for 48 hours by covering the treated area with a thick polythene sheet. Remove the cover after 48 hours of treatment. The bed is kept open for 7– 8 days prior to seed sowing. Immense precaution is needed while application. Gloves, masks and goggles must be used by the applicator to avoid direct contact with fumes.

# Protection of Seedling

## Soil treatment:

- **Insecticides:** Larvae of many insect pests can be checked by the application of insecticides in the soil.
- **Biological method (bio-agents):** Certain biological agents, like *Trichoderma spp.*, are found effective against wilt causing and rotting fungi present in the soil and *Pseudomonas* control fruit or stem rot. These bio-agents are used at the rate 10–25g/sq m and are mixed well in the soil while preparing the beds.

# Protection of Seedling

## Soil treatment:

- **Fungicides:** *Captan* and *carbendazim*, can be applied to the soil by either method- dry application at the rate 5g per sq m or drenching 4–5 litre of 2.5–3% solution of fungicides to control soil-borne pathogens.

# Protection of Seedling

## Seed treatment:

Seed treatment with fungicides has been found to be effective against seed-borne, as well as, soil-borne pathogens. Fungicides, such as *bavistin* or *thiram*, are applied at the rate of 2.5–3 g/kg seed not only to prevent seed-borne infections but also to provide protection against soil-borne infections.



# Summary

In this session you have learnt about the growing media and its types, nursery bed preparation and its importance and protection of seedling.

**Project Coordinator : Dr. Rajiv Kumar Pathak**

**Assistance**

**Dr. Sanvar Mal Choudhary**

**Dr. Narendra Vasure**



**Joint Director**

**PSS Central Institute of Vocational Education  
Shyamla Hills, Bhopal – 462013 , Madhya Pradesh, India**

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**E-mail: [jdpsscive@gmail.com](mailto:jdpsscive@gmail.com)**

**Tel. +91 755 2660691, 2704100, 2660391, 2660564**

**Fax +91 755 2660481**

**Website: [www.psscive.ac.in](http://www.psscive.ac.in)**