

# JOB ROLE – GARDENER

Sector – Agriculture

(Qualification Pack Code: AGR/Q0801)

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 1: Nursery and Its Importance**

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# Session Objectives

The student will be able to :

- Describe importance of nursery and its types.
- Demonstrate soil and seed treatment in flower crops.

# Introduction

A nursery is a place where rooting of planting materials or germination of seeds can be obtained in a better way, under favourable growing conditions. In a nursery, seeds germinate effectively and seedlings give better stand in field. The period required for germination and establishment of seedlings can be easily utilised in a nursery and skipped in the preparation of land or harvest of previous crop in the field.

Flowering crops are mostly raised by seeds, cuttings, layer and grafting. In vegetatively propagated crops, root stocks are raised by seeds, or cutting. All these require care and can be grown well in a nursery under supervision.

# Importance of Nursery

- Wastage of small and expensive hybrid seeds is reduced considerably due to better care and management.
- Germination percentage can be improved by providing ideal condition in a comparatively smaller place.
- The management of seedlings can be done in a better way with minimum care, cost and maintenance as the nursery area is small.

# Importance of Nursery

- By selecting vigorous and healthy seedlings in the nursery for transplanting, better and uniform crop growth can be obtained in the main field through better survival chances.
- The control of insect pests, diseases and weed is easy in a nursery.

# Selection of Nursery Site

Several factors are responsible for the selection of appropriate site of nursery.

- 1. Location:** A nursery must be located in a pollution-free environment away from brick kilns, smoke-emitting industries and rough motorised roads. There is adequate sunlight at the nursery site.
- 2. Topography of land:** The topography of land at the nursery site must be even. In hilly areas, it may be divided into levelled terraces.
- 3. Soil:** The soil must preferably be loam or sandy loam with organic matter content. The pH of the soil 6.5 to 7.5. It have good water retention capacity and aeration.

# Selection of Nursery Site

- 4. Water:** The nursery must be located near a water source, so that in the course of nursery raising, at any time, there is no water scarcity.
- 5. Drainage:** The nursery site must be well-drained and free from water-logging.
- 6. Transportation:** It must not be far off from the potential market so as to avoid damage to the seedlings during transportation.
- 7. Labour:** As nursery work is labour-intensive, the nursery site must have enough labourers.

# Selection of Nursery Site

- 8. Protection from animals:** The nursery area must be protected by enclosures so as to prevent damage to the plants by stray animals.
- 8. Market needs and market size:** The nursery must be located near the city so, people can purchase the plants. Alternatively, a mechanism to explore domestic and international markets must also be worked out for the success of nursery business.

# Types of Nursery

Nurseries are classified on the basis of duration, plant produce and structure used.

## On the basis of duration

**1. Temporary nursery:** This type of nursery is developed only to fulfil seasonal requirements or a targeted project. Temporary nurseries are mostly used for raising of seedlings of vegetables and flower crops.

### Main features :

- Constructed for a short period and is small in size.
- Located near planting site, hence, distance between nursery and actual planting site is less.

# Types of Nursery

## Temporary nursery:

### Advantages:

- Mortality or injury due to shock of lifting and transportation of seedlings is negligible
- Initial investment in temporary nursery is less

### Disadvantages:

- Because of its temporary nature, some of the basic facilities like irrigation may not be adequate

# Types of Nursery

**2. Permanent nursery:** In this type of nursery, the plants are nourished and kept for a long period of time till they are sold out or planted permanently in the field.

## **Main features:**

Permanent nursery comprises office, store, mother blocks, nursery beds, protected structures, irrigation source, electricity, transportation facilities, packing yard, manure, cattle and machinery shed. It has a record of sale and purchase, history and record of mother plants and record of produced planting material.

# Types of Nursery

## Permanent nursery:

### Advantages:

- Greater range of planting stocks, such as seedlings, grafted plant, budded plants, layers, rooted cuttings, etc., are available.
- Being permanent in nature, it becomes a perpetual source for the supply of planting material for many years.

### Disadvantages:

- Initial investment cost is high.
- Transportation cost is more.

# Types of Nursery

## On the basis of types of plants produced

**Ornamental nursery:** Seedlings, root stock and scion material of ornamental plants is raised and conserved for further use. This nursery includes mother block of ornamentals, which serve for scion material in layer age, budding and grafting. Raised and flat beds of the nursery occupy seedlings of different annuals, perennials and root stocks of ornamentals. Ornamental nursery also has many indoors and outdoor potted plants.

# Types of Nursery

## On the basis of types of plants produced

**Vegetable nursery:** Planting materials, like seedlings of all vegetables, rooted cuttings (asparagus, sweet potato), seedlings raised from rhizomes (ginger) and tubers (potato), bulb (onion, garlic) for seed purposes are raised and conserved.

**Fruit plant nursery:** Seedlings and cuttings of root stocks, budded plants, grafts, layers and cuttings of fruit trees are raised and conserved for further use. This nursery has mother block of different fruit crops used as scion material.

# Types of Nursery

## On the basis of types of plants produced

**Forestry nursery:** Different species of trees and climbers planted in forests and used in social forestry are mostly propagated by seeds. Seedlings of big trees, like margosa, gulmohar, *amaltas*, *kanchan*, tamarind, *aonla*, oak, eucalyptus, etc., are commonly found in a forest nursery.

## On the basis of structure used

**Open field nursery:** These nurseries are established in open areas without any permanent structures. Usually raised, flat or sunken seed beds are prepared.

# Types of Nursery

## On the basis of structure used

**Hi-tech nursery:** Such a nursery established under protected structures, can be successfully raised.

**Thatched-roof:** This type of nursery is constructed over the nursery beds. This protects the seedlings from damage from extreme wind, rain, temperature or hot sun, etc. It is less costly but not very effective.

**Shade-net:** Such a nursery is raised under shade-net houses to give different amount of shade based on the crop requirement, shade-nets of different colours and mesh size are used as covering material.

# Types of Nursery

## Hi-tech nursery:

**Poly-tunnel:** The nursery is covered with plastic material to form a tunnel. It is a miniature structure, which produces greenhouse-like effect. The seedlings are protected from cold, wind, storm, rain and frost. Due to modified conditions, there is better germination and plant growth.

**Greenhouse/polyhouse:** It is a frame covered structure with polyfilm or shade-nets so that plants can be grown under partially or completely modified environment. Seedlings are raised inside the structure on raised beds, or in plug-tray, used for hardening of seedlings and tissue-cultured plants.

# Nursery Beds

**Nursery beds:** It refers to a land, which is made free from weeds, stumps, stones, pebbles, etc., and is used for sowing of seeds to raise seedlings and multiplication of different species of plants through asexual means.

## Preparation of nursery bed

Nursery beds can be prepared in three different ways.

### 1. Sunken bed

- Soil of the nursery bed is thoroughly mixed with rotten farmyard manure.
- This type of nursery bed is prepared in dry and windy areas.
- These provide protection to the seedlings during high winds as these can be easily covered.

# Nursery Beds

## 2. Level bed

- The soil of the seedbed must be sterilised by soil solarisation or with chemicals to avoid contamination of pests and diseases.
- After soil preparation, the recommended dose of manure and fertilisers are mixed in the nursery bed.
- For efficient management, the whole area is divided into uniform size of small beds.
- These types of bed are prepared during non-rainy season (summer and winter) so that there is no waterlogging.

# Nursery Beds

## 3. Raised beds

- Such nursery beds are prepared during the rainy season.
- The land is levelled and made free from weeds, stumps, stones, pebbles, etc.
- The soil of the nursery bed is thoroughly mixed with 5-10 kg per sq. m rotten farmyard manure.
- These beds are prepared about 15 cm high from the ground level. The width is kept at 11.5 m and length 35 m.

# Nursery Beds

## Precautions to be taken during preparation of nursery beds

- Nursery beds must be prepared in fertile soil rich in organic matter content with good drainage and aeration.
- Soil-borne infections of nematodes, insect-pest and pathogens may be avoided
- Seedlings are tender and succulents and prone to heat shock, so the beds must be prepared at site receiving partial shade.
- Excess irrigation in sunken or flat beds may lead to rotting of seeds, seedlings and damping off incidence.

# Soil Treatment

Soil or any planting medium used in the nursery may be contaminated by various pests. The medium used for the nursery must be free from infections. The different methods adopted for soil treatment are as follows.

## **1. Soil solarisation:**

It is an environment-friendly method to control soil-borne plant pathogens, including bacteria, fungi, nematodes insect-pests, and weeds. The most appropriate time for soil solarisation is May–June when the temperature reaches 47 °C or above. This treatment causes physical, chemical and biological changes in the soil.

# Soil Treatment

## 2. Formalin solution

- Formalin solution is prepared by adding 2.5 ml commercial grade formaldehyde per litre of water and the soil is drenched @ 45 litre of solution per m<sup>2</sup> to saturate the top soil surface up to a depth of 15-20 cm.
- The drenched area is covered with a polythene sheet of 200 gauge so that the fumes of formalin penetrate into the soil to kill the pathogens.
- The polythene cover is removed after 48 hours.
- The bed is kept open for 7-10 days prior to seed sowing.

# Soil and Seed Treatment

## 3. Soil treatment by fungicide

- Fungicides like captan or thiram @ 5 g/ m<sup>2</sup> are used to control soil-borne pathogens.
- These fungicides can also be used as soil drench by preparing a solution of 2.5–3 per cent and drenching @ 4-5 litre/m<sup>2</sup>.

## 4. Soil treatment by insecticide

- Insecticide such as chloropyriphos @ 2 ml/litre of water is applied to a depth of 15–20 cm in the soil to kill insects, including ants, white ants, their eggs, nematodes, etc.

# Soil Treatment

## 5. Use of bio-agents

- Certain biological agents like *Trichoderma* are used to control soil-borne pathogens.
- Bio-agents @ 10-25 g/m<sup>2</sup> are mixed in the soil and after 2-3 days the seeds are sown.

# Seed Treatment

To keep the seeds free from pathogens, fungicides like *captan*, *thiram* are applied @ 2.5-3 g/kg seed, and mixed thoroughly to disinfect the seed surface of the entire seed lot.

**Mother Block:** For different methods of vegetative propagation, various plant parts, such as bud, branch, etc., are used as propagating material. The plants from which the plant parts are collected for propagation are known as 'mother plants'. To get healthy and true-to-type planting material, it is mandatory that mother plants are maintained. Thus, there is a necessity for the establishment of mother plant block. Progeny tree, which is true to type in nature, healthy, free from diseases and insect-pests, and is high yielding in nature, and stock plants are maintained in the mother block area of the nursery.

# Summary

In this session you have learnt about the importance of nursery and its types, nursery beds, soil and seed treatment.

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

**Assistance**

**Dr. Narendra Vasure**

**Dr. Sanvar Mal Choudhary**



**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)**