

Preparation of Nursery Bed /Seed Bed

Nursery is a place, where seedlings, saplings, trees, shrubs and other plant material are grown and maintained until they are placed in permanent place. Seedlings at early stages deserve special attention which is only possible in nursery. Setting up of a horticultural nursery is a long term venture and requires careful planning and expertise. Establishment, management and marketing are major considerations of nursery.

Establishment of nursery

The nursery should be established in such an area where cultivation of fruit crops is on sizeable area and there is need for a nursery, having demand for saplings. In such area/region, following considerations need to be observed for selecting an appropriate location.

1. Nursery should be established in the important production areas.
2. Nursery soil should be deep, fertile, well drained and free from pathogens.
3. The site should be well connected by different means of communication and must be easily accessible.
4. The area should be well protected.
5. Soil and micro-climatic conditions should be appropriate.
6. Availability of irrigation and power supply should be ensured.
7. Sufficient labour and skilled person should be available to handle different operation..
8. Availability of progeny/mother stock (bud wood source tree) and root stocks should be ensured.
9. Availability of propagating/growing structure, hardening chamber etc.
10. Availability of working shed, pot and packaging yard and sale unit etc.
11. Availability of office building, staff quarters etc.

Purpose - One of the important operation for horticulture crop is raising of seedlings (fruit trees, vegetables, shrubs and flowering annuals). In many plants, the seeds are first sown in seed beds and after sometimes seedlings are either directly transplanted in the actual field as in case of some vegetables, flowering annuals, shrubs, and trees or may used as root stock as in case of fruit trees like mango, guava, aonla etc. For healthy and good stand of seedlings proper preparation of nursery bed is essential. Since large number of seedlings are raised in small area,

due consideration of adequate moisture and nutrients, protection from pest & diseases, strong sunlight and wind is very important. These factors will vary if seedlings are raised in protected structure.

Materials required- Spade, khurpi, rake, rope, pegs, measuring tape, water cane, plastic sheet, manures and fertilizer insecticide, pesticide, fungicide etc.

Procedure- Select the proper area for preparing nursery bed having well drained fertile loamy soil rich in organic matter and sunny situation. Mark out the area required for nursery. Dig the soil about 25-30 cm deep with the help of a spade or kudali. Remove weeds, weed roots and stones etc. Level the land with the help of rake. If the soil is heavy clay or silt then mix sand at the rate of 4-5 kg per sq. metre. After this spread well decomposed FYM (Farm Yard Manure) at the rate of 5-6 kg per sq. metre. Fertilizers like urea, single super phosphate and potassium chloride at the rate of 200-250 g per sq. metre.

Preparation of Nursery bed- Nursery beds of 1- 1.20 m wide and convenient length 5-6 m are considered ideal. In between two parallel beds a space of 50-60 cm should be provide for cultural operations. The height of bed should be 15-20 cm particularly during rainy season and 10-15 cm during winter season from the soil surface.

Type of Nursery bed

1- **Raised Nursery bed-** During rainy season, it avoids losses through water stagnation by facilitating proper drainage of excess water.

2- **Flat Nursery bed-** During winter and spring season, seedlings is raised in flat bed. In this case, cost of preparation is less.

3- **Sunken Nursery bed-** During summer, seedlings should be raised in sunken type of nursery bed. It protects the plants from hot dry winds.

Soil treatment/ Sterilization of Nursery beds- Several times, soil contains certain harmful pathogens, which interferes with growth and development of seedlings. These harmful insects can be eliminated by pasteurization, solarization, changing the sight of nursery or by chemical treatment.

Solarization- It is simple and effective method for soil sterilization. For this, soil mulching is done with black polythene of 200-300 gauge during the period of high temperature and solar radiation. The edges of polythene sheet should be pressed in the soil to minimize the air circulation. Soil should be kept moist before mulching to increase the latent heat and thermal sensitivity for resting he soil borne pathogen, harmful insects and weeds which can be reduced to a sustainable level.

Chemical treatment Seed bed treatment-

1- Formaldehyde (Formalin) 1% can also be used for soil treatment. 5 litre of this solution is sprayed uniformly on soil surface per sq. meter. After spraying the beds should be covered with black polythene. The edges of the polythene need to be sealed with wet soil to make air tight. Polythene should be removed only after 10-12 days. The seed should be sown only after 6-7 days after removing the polythene.

2- Spray the bavistin 0.1% - 0.3% on the moist bed or Sevin dust 20-25 gm/sq.m area and leave the bed for 2-3 days.

3- 1% solution of Trichoderma viridi also can be used for seed bed treatment.

Seed treatment-Before sowing the seeds in the sterilized bed, seed should be treated with 0.3% suitable fungicide eg. ceresan, bavistin, thiram.

Sowing of seed- In well prepared beds, the seed should be sown in miniature furrows. The depth of furrows will depend upon the seed size. For bolder seeds of furrow should be kept 5-6cm kept and for smaller and fine seed depth should be kept 1-3 cm. The furrows should be covered with a mixture of leaf mould and sand (3:1).

Care and handling of Seedling- The protection should be against strong sun and rain, frost etc. Covering the beds with agro-net/ mosquito net at a height of a meter will protect the seedlings against strong sunshine and wind. Spraying with fungicide and insecticide as and when required proves very useful to the seedling health.

Components of modern nursery

A number of structures may be necessary for raising a nursery. To establish the nursery, the following structures need to be constructed:

1. **Fencing**: It is required to protect a nursery particularly from stray animals.

2. **Progeny block** (bud wood source tree)

In progeny block, true to type mother plant are maintained in the nursery. Suitable plant types with existing superior cultivars/varieties should be collected and maintained in the progeny block. The mother plants should be true to type, healthy, heavy bearer with standard quality fruit having tolerance to biotic and abiotic stresses. Care should be taken to label the plants properly.

3. **Rootstocks and seed gardens**-After establishment of scion bank, next priority should be given for the establishment of the rootstocks or seed garden. Seed propagation is the most usual way for mass production of rootstocks.

4. Growing structures:

There should be provision of modern propagation structure like greenhouse/polyhouse, mist chamber etc. these structure provide optimum growing conditions for seed germination, rooting of cutting, hardening of seedlings. Now a day's green house has become a prerequisite of Hi-Tech nursery. Shade nets are useful not only for reducing heat injury to young plants, but their use also reduces transpiration. Shade nets are available in different colours and densities.

5. High Humidity Chamber:

This technique resolves the common problem of grafts or cuttings dying due to desiccation (drying up) when planted in the soil for rooting, by ensuring a humid atmosphere around the cuttings, thus preventing excessive evaporation.

6. Use of Supplementary Light:

Several plants go into winter dormancy when the day length gets short. Additional light from tube lights, given after sunset, creates long-day condition that prevents the plants from going into winter dormancy.

7. Drought Hardening:

Plants that are raised under high atmospheric humidity and shade often die due to transplanting shock when shifted to the fields. To prevent this, the plants are hardened by allowing external dry air to enter the chamber gradually.

After having established the above infrastructure, the nursery establishment and planning involve division of the nursery into different units, viz., propagation unit, production unit, packaging unit and sale unit.

1. Propagation unit

Propagation unit is the major unit of nursery work and includes:

- (i) Actual propagation structures such as green house, hot beds, cold frames and mist house.
- (ii) Service structures such as head house.
- (iii) The alley house connecting to the hot beds and cold frames with head house. It provide a passage for the transport of plants, propagation media, soil and fertilizers from head house to propagation structures, and must be sufficient wide to permit easy and quick movement.

(i) Primary nursery (Seedbeds)

Seed beds near to water source and to office so that they can be kept under vigilant control. The raised seedbeds of 6-8 cm height, 1 meter width and of convenient length, free from stones

should be prepared with upper 2.5-5cm of the bed filled with sand. Soil can be prepared to fine tilth, add sufficient quantity of rotted FYM, vermin-manure or pig manure at least 10-15 days earlier of seed sowing. The bed may be treated with 1% Bordeaux or 0.1% Bavistin before sowing of seeds.

(ii) **Nursery beds**

Seedlings from seed beds are removed and transplanted in the nursery beds. Nursery beds should be located in an open area near to water source. Nursery beds should be prepared by adding sufficient organic manures and fertilizers. Nursery beds should be divided into section as per crop and varieties. The nursery beds should be laid out in such a way that there is an access to all the beds through roads or paths.

(iii) **Pot yard**

The pot yard should be in shade because the tender plants require shade as compared to hardy plants. This section should be near to water source. Trenches can be provided for keeping potted plants closely packed together.

2. **Production Unit**

The object of this unit is to rear the new plants from seedling to marketable stage. This unit is divided into different blocks, each block being meant for only one kind of plant or species. This helps on sorting of plants, easy record keeping and doing the operation as per the need of a plant species.

3. **Packaging Unit:**

The packing yard is used for packing the plants before sale or dispatch to out stations. The yard can be combined with working shed. It is near to sale counter.

4. **Sale Unit:**

The objective of the sale unit is to market the nursery plants effectively. The design and layout of this unit should be attractive to the customers. This should be usually located on a well travelled way and may be by the side of production unit. The sale unit is usually divided into three different parts such as display unit, sale and packing, and parking unit.