Practical-3

Preparation of Nursery Beds for Raising Vegetable Seedlings

Exercise 3.1: Preparation of nursery beds for raising healthy seedlings of different vegetable crops

OBJECTIVE:

- To impart knowledge of innovative nursery raising technique for different vegetable crops for raising quality and disease free seedlings.

Delivery schedule: 02 periods.

Student's expectations/learning objective:

- Importance of nursery raising in vegetable crops.
- Selection of site for nursery raising.
- Method for preparation of nursery bed.

Handouts/material/equipment's & tools required: Paper sheet and pen to note down the instructions, different tools for land preparation, farmyard manure, fertilizers, seeds of vegetable crop, bavistin *etc.*

Pre-learning required: Innovative nursery raising techniques in vegetable crops.

Introduction:

As we have discussed in Practical 2 that vegetable crops are propagated either through seeds or vegetative plant parts. Vegetable crops propagated through seeds are either directly seeded or are transplanted in the field by raising the seedlings in the nursery beds. A nursery could be considered as a location where plants are cared for during the early stages of growth by providing optimum conditions for germination and subsequent growth until they become strong enough for planting in the open field conditions. The seeds of solanaceous vegetables, cole crops, onion *etc.* are first sown in the nursery.

Advantages of nursery raising in vegetable production

- It is very easy and convenient to look after the young tender seedlings growing in a small but compact area of a nursery.

- Favourable conditions of growth can be provided easily to the growing seedlings in a nursery.
- It eliminates the problem of seed emergence in heavy soils.
- It provides temporary protection from extreme weather conditions.
- Timely and easy management of pests and diseases in short growing period of 4-5 weeks.
- Weed control is easy in a small compact area.
- There is economy of land and more time is available for the preparation of land where transplanting is to be done.
- Uniform crop can be harvested if the crop is raised through nursery sown seedlings.
- Optimal use of expensive hybrid seeds and economization of the seed by sowing in nursery beds.
- Sowing seeds in the nursery bed and then transplanting into the main field help in eliminating a part of the unfavourable weather conditions and also helps in getting early crop by adjusting suitable date of planting and there by securing a higher price for the produce.

Factors to be taken into consideration for raising nursery

Location of the nursery:

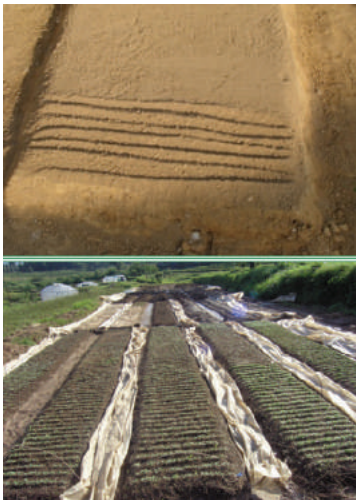
- Nursery should be situated near the main field for transplanting.
- Nursery area should receive sunlight right from morning till evening *i.e.* south-west aspect is most suitable as this aspect is very sunny.
- Area must be free from water stagnation *i.e.* proper drainage must be provided.
- Area should be well protected from stray animals and strong winds.
- The area should be near the water source for continuous supply of good quality water.

Soil

- Soil should have good organic matter.
- Soil texture should be neither too coarse nor too fine.
- Soil should be sufficiently porous and adequately aerated.
- It should have a fair degree of water holding capacity.
- Soil pH of nursery bed should be in the range of 6 to 7.
- Acidic and alkaline soils are not suitable for raising nursery rather, neutral soils are suitable.
- Soil should normally be rich in all essential nutrient elements. Preferably soil testing of nursery area should be done so as to mix additional nutrients accordingly for improving its soil fertility status.

Procedure for nursery bed preparation:

- The soil of the nursery area should be fine and fertile with good water holding capacity. For the preparation of beds, the field should be ploughed and levelled well. Soil should be worked thoroughtly to obtain a fine textured soil free of clods and debris.
- Prepare raised beds to facilitate proper drainage of excess water. The level of the bed surface should be made little slanting on the two sides.
- The length of nursery bed should be 3-5 m but it can be increased or decreased according to the availability of land and requirement of plants but the breadth of the beds should not be more than 1.00 -1.2 m and the beds should be 15-20 cm raised from the ground surface.
- The standard size of nursery bed is 3m × 1m × 15 cm.
- A space of 30-45 cm should be left between two beds. This space can be utilized to perform intercultural operations such as weeding, disease and insect-pest management and also for draining out the excess rain water from the nursery beds.
- Add 20-25 kg well rotten farmyard manure in each standard size nursery bed along with 200g single super phosphate and 15-20 g each of fungicides and insecticides such as mancozeb and dusts like methyl parathion.
- The number of nursery beds depends on the particular crop, season and growing area of crop for transplanting.



Model nursery

- The beds should be prepared in the east and west direction and lines/ rows for sowing of seeds should be made from north to south direction on the beds.

Seed Sowing in nursery bed

- Treat the seed with fungicides like bavistin or thiram or captan @ 3g/kg of seed to check the infection of soil borne diseases.
- Make rows at a spacing of 5 cm.
- Sow the seeds at 1 cm depth. The general rule for sowing depth is 2-3 times of the thickness of seed.
- Mix a little of sand in the seed for uniform distribution in the rows and cover it with soil or farmyard manure.
- Avoid broadcasting seeds in the nursery-bed. Thick sowing or sowing with broad casting also leads to increase in an incidence of damping off disease.

- If seeds are sown too deep, nutrient reserves will be exhausted before the plant emerges or emerging plants will be weak or liable to die. If sown too shallow, then it is likely to be eaten by birds or washed away by the splash of rains or irrigation water.

Table: Quantity of seed and nursery area required for raising seedlings for one hectare area

Crop	Seed rate (g/ha)	Nursery area required (m^2)
Tomato (hybrid)	150-200	75-100
Tomato (op)	250-300	100-125
Brinjal	300	150
Chillies	500-600	75-100
Bell pepper	400-500	100-150
Early cauliflower	700	150-200
Mid and late cauliflower	400-500	150-200
Cabbage	400-500	100-150
Onion	8000-10000	500

Use of mulch

- After sowing, cover the seed bed with a layer of dry grass.
- Apply water over the grass so that seed does not come up on the surface of the bed.
- Mulching maintains the soil moisture and temperature for seed germination.
- It protects the growing seeds/seedlings from direct sunlight and rain drops.
- It protects seeds against bird damage

Removal of mulch

- Due attention is given to remove the covered mulch from the seedbed.
- After three days of sowing, observe the seed beds daily.
- As and when the white thread like structure is seen above the ground, remove the mulch carefully to avoid any damage to emerging plumules.

Use of shading nets or polysheets

- After seed germination or during the seedling growth, if there is very high temperature (> 30° C), cover

the nursery bed with 50% or 60% shading nets (green or green + black coloured) about 60 - 90 cm above ground by providing suitable support.

- During winter season, cover the nursery bed over night with polythene sheet about 60-90 cm above ground by providing suitable support. Remove the sheet in the morning before the temperature rises. This technique protects young seedlings from severe winter frost or low temperature injury.
- Also during rains, cover the nursery bed with polysheet by providing proper support.

Watering

- Provide light irrigation to the nursery beds with rose can till the seeds germinate.
- During summers, irrigate the beds twice in a day *i.e.* both morning and evening.
- During winters, irrigation once in a day is sufficient.
- Keep beds moist but not wet otherwise "damping-off of seedling" may appear.
- Excess rainwater or irrigated water should be drained out from the nursery bed otherwise plants may die due to excess of water.
- Watering in the beds depends upon the weather condition. If temperature is high, irrigation is applied whereas irrigation is not needed during rainy days.

Thinning

- It is an important operation to remove weak, unhealthy, diseased, insect-pest damaged and densely growing plants from the nursery beds keeping distance of about 0.5 to 1.0 cm from plant to plant.
- The thinning facilitates balanced light and air to each and every plant. It also helps in monitoring the disease and insect pest infestation.

Interculture and weed control

- Timely weeding in nursery is very important to get healthy seedlings. If there are some weeds in the seed bed, remove them manually either by hand or by hand hoe (thin forked *Khurpi*).
- Pre emergence herbicides can also be sprayed soon after the seed is sown to control the weeds. Stomp @ 3 ml/litre of water should be sprayed on the nursery beds after the seed sowing and covering with mixture of farmyard manure, soil and sand.
- For good quality seedlings, spray urea @ 0.3 per cent when the plants are 8-10 cm tall.

Plant protection

- Adoption of plant protection measures in the nursery against the incidence of insect pest and diseases is very important task to get the healthy seedlings.

- Damping off is a very serious disease affecting seedlings in the nursery. Timely care for controlling diseases and insect-pests is essential.
- Treat the seed with bavistin or thiram or captan @ 2.5g/kg of seed.
- If the disease appears after the seed emergence, drench the nursery beds with 0.1% solution of brassicol or 0.7% captan or thiram after germination.
- It will be better to remove and dispose off the affected seedlings from the beds to avoid further spread of pests and diseases.

Hardening of the plants in the nursery

- Withhold irrigation in the nursery beds 4-5 days before the date of transplanting but on the day of transplanting, first apply water to the nursery beds and then take out the plants for transplanting.
- Hardening should be gradual to prevent or check the growth.
- Warm season crops like tomato, brinjal and chillies cannot withstand severe hardening.
- Hardened plants withstand unfavourable weather conditions like hot day winds or low temperature more efficiently than non-hardened seedlings.

Transplanting

- After 4-6 weeks of sowing, the plants become 10-15 cm tall and are ready for transplanting.
- Select healthy plants for transplanting and always transplant in the afternoon.
- Before transplanting, the seedlings should be dipped in a solution of 0.25 per cent mancozeb and 0.05 per cent carbendazim.
- Fix the plants well in the open field and water them daily till they establish well.

Exercise

3.1 Prepare nursery beds and raise the seedlings of tomato during December-January by protecting them from severe frost.

3.2 Raise seedlings of cauliflower and onion in the respective periods of growing by preparing nursery beds.