NATIONAL OPEN UNIVERSITY OF NIGERIA

CRP 304

Principles of Horticultural Crop Production

Module 4

CRP 304 (Principles of Horticultural Crop Production) Module 4

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Unit 1 Nursery Plant and Production

1.0 Introduction

In horticultural crop production some crops are planted directly while some are not planted directly. Those that are not planted directly have to be placed under intensive care for a period of time before they are taken to the field. This unit explains the procedures of nursery practices and why it is necessary for some crops to be raised in nursery before they are taken to the field.

2.0 Objectives

At the end of this unit, you should be able to;

- define nursery
- state the advantages and disadvantages of nursery
- explain the factors that determine the choice of location for field nursery.
- explain the types of nursery
- explain the preparation of nursery.

3.0 Main Content

3.1 Nursery

Nursery refers to very special prepared seed beds where young seedlings can be raised in a more protected environment before they are transplanted in the field or nursery can be defined as a place where young crop plants are raised under intensive management for later transplanting to the field. Although many of the important tree crops and Vegetables can be sown directly in the field, experience has shown that raising seedlings in the nursery has a number of advantages. Some of these advantages are;

i. Economy of seeds – fewer seed are required for raising seedling in the nursery than for sowing directly in the field.
ii. Seedlings receive more intensive care (protection against animals, diseases and pest; regular maintenance practices, watering, irrigation, manuring, etc) in the nursery.
iii. Raising seedlings in the nursery affords the planter an opportunity for selecting well grown, vigorous and disease free- seedlings.
iv. Where vegetative propagules (vegetative parts) are used, it is often essential to cultivate them in special nurseries until they have stock roots before planting out as in ornamental plants.
v. Shade management – most nursed plants because of their tender nature need to be protected against scorching sun for quite a period of time and they are transplanted when they are hardened.
vi. Cultural practice such as mulching, chemical spraying and others are easily carried out in a nursery.

They rising of seedlings in the nursery has some disadvantages and this include

i. High cost as a result of nursery practices is introduced into the total cost of crop after production.
ii. Nursery labour is specialised and therefore expensive.
iii. It is more expensive to transplant seedlings than to plant seeds at stake.

Despite these disadvantages, most tree crops, some Vegetables and ornamental should be established in a nursery, particularly when either the varietal or genetic nature of the materials can be guaranteed only for nursery grown / selected materials, or when special techniques (e.g budding) demand nursery technique.

3.2 Factors that Determine the Choice of Location of Field Nursery

The following factors determine the location of a field nursery.

i. Choice of Soil: - Since nursery practice aims to provide a high standard of husbandry to the young developing plants, it is usual to select a good soil both for the location of the nursery and the filing of containers it is desirable to choose a free draining fertile soil and if necessary fertilisers may be used to maintain good nutrient balance. In choosing such a soil, two factors have to be considered.
   a) The ease of lifting plants
   b) Water retention.

The recommended soil based on the above factors is sandy loam soil.

ii. Choice of Site: - The site for a nursery should be as level as possible. Slopy site should be avoided. Nursery should be sited away from strong wind. The problems of strong winds can be controlled by planting wind break using 2 or 3 lines of tall trees.
iii. Near to Source of Water: - Since frequent watering is required, nearness to water source is important. A nursery should have permanent and a continuous source of water. Water may be provided by a bore-hole or a small reservoir or a well. A nursery should not depend on any external water supply.
iv. Proximity to Planting Sites: - To reduce transportation problem, cost and handling problems, nursery should be sited near the final field.
v. Accessibility: The nursery should be easily accessible to the field, to the road or market.
i. Slope or Land Gradient. Level land is ideal for establishment and maintenance of a nursery. It reduces the risk of soil erosion. It also enhances application of irrigation water. However, appropriate conservation methods should be undertaken if a nursery is sited on a sloppy land.

3.3 Types of Nursery

There are many types of nursery or seed beds but basically we can classify nursery into 2;

i. Ground nursery
ii. Portable nursery.

3.3.1 Ground Nursery and their Preparation.

Ground nursery is used for raising Vegetables like tomatoes, pepper, cabbage and others. There are various stages in the preparation of ground nursery. Here we are going to discuss bed preparation for a tomato nursery.

a) Bed Preparation: - A bed 90 – 120 cm wide and as long as possible should be made. The bed may be raise up to 15 cm high or sunken by the same dimension as the case may be. The soil is compacted and raked to make a level surface. If there are any clods these should be broken into a fine till.
b) Application of Chemical: - This should be applied 2 weeks before the seeds are sown and should be done uniformly. Chemical to be applied include nematocide, arcaricide for control of mites and ticks. Examples of nematocide are nemagon, and examples of arcaricide are parathion and Malathion. During the application of the chemicals, the soil should be moist (not to wet or too dry) and the chemical can be applied either single or mixed at the rate of 8.5 g/m^2 and should be in corporate into the soil at depth of 15-20 cm. During application, all precautions should be adhered to.
c) Fertiliser Application: - The compound fertiliser (N.P.K. of grade 20:10:10 or 15:15:15) may be applied uniformly at the rate of 30 g/m^2 and properly raked.
d) Sowing: - After fertiliser application, the seeds beds should be consolidated again and level led. With a blunt stick you draw your spacing and the spacing should be 10-15 cm apart and a depth of 6 mm. The seeds are then sown lightly and thinly in the drill or furrow and covered with soil lightly.
e) Mulching: - After sowing, the seed bed is mulched with dry grass. This is to protect the seed from being washed away by heavy rain. The mulch also helps to conserved soil moisture needed for seed germination. The mulching should be removed as soon as the seed germinate.
f) Watering: - Watering should be done at interval of 2 – 4 days depending on how dry the climatic condition is. The seed bed should be watered with a fine spray from a watering can.
g) Thinning: - As soon as the first two leaves start to develop, it is necessary to thin the seedlings in order to promote steady growth. Seedling must be allowed a spacing of 5 cm apart. When the seedlings grow to the required height of 8-10 cm or 4-5 weeks, they are transplanted in the field.


Ground nursery

3.3.2 Portable Nursery

Portable nursery is a movable nursery and can be categorized into 3;

- Box or tray nursery
- Pot nursery
- Polythene bag nursery


Polythene bag nursery


Box tray nursery

In a portable nursery (box or tray, pot and polythene bag portable nursery), the soil should be sandy loam well manure and preferably sterilised when using boxes, it should be of convenient size about 45 by 30 cm and the depth of the soil should be about 10 cm. The bottom of the container should be perforated to drain out excess water. Draining hole should be about 5 mm in diameter and spaced 15 cm apart.

3.3.3 Preparation of Portable Nursery

a. Cover the drainage hole with small stones or gravels to prevent soil particles from blocking the drainage hole.
b. Place a thin layer of dry grass to serve as an aid to good drainage.
c. Fill the box within 1 cm of the top with a mixture of sandy loam soil and farm yard manure in the ratio of 3:1 by volume.
d. The surface of the soil is then level led and firmed. It is important to have a good level surface to avoid light seeds being washed to one side during watering.
e. Make grooves or drills not more than 1cm deep and 10 cm apart with a blunt stick. Sow the seeds in these grooves not too close together.
f. Scatter fine soil over the seed and lightly firm it.

g. Water the soil lightly by sprinkling. The seed box should be watered enough so that the soil appears moist but not too wet to avoid over watering.
h. Placed boxes on a firm support off the ground to protect them from pest e.g. insect, sheep and other animals.
i. After the seeds have started to grow, it may be necessary to thin out the seedlings to ensure healthy steady growth.

Self-Assessment Exercise

i. Define nursery
ii. State the different types of nursery
iii. State 3 reasons for establishing a nursery.

3.4 Transplanting

Transplanting is the planting or movement of seedlings from the nursery to the main field. This is usually done when the seedlings have reached a certain period in the nursery and they can with stand the environmental conditions in the field. For tree crops usually the field is cleared and holes dug at a spacing of 3x3 m for trees such as pawpaw guava. 8x10 m for mango and manure placed at the bottom of the hole about 3-5cm before transplanting is done while for Vegetables, beds are raised about 15-20cm before transplanting.

Beds meant for transplanting Vegetable crops should be raised during the rainy season to encourage good drainage and better aeration of the soil. During the dry season or areas with light rainfall, beds should be sunken to conserve water. The success of transplanting is reflected by.

a. The fact that seedlings have recovered very rapidly.
b. The degree of establishment.

The success indicated by the fact that seedlings have recovered very rapidly and also the degree of establishment depends on 4 factors;

i. The Plant Type or Species: - Some species establish easily e.g. sweet potato while others do not take up easily and should not be transplanted e.g. okra and carrot.
ii. The Age of the Seedlings: - The larger the seedling, the more difficult it is to recover.

When the seedling is large, many roots are damaged and this could lead to high transpiration in relation to water absorption. This results in wilting and lack of recovery. The optimum time for transplanting Vegetable crops are; Amaranth 2-3weeks, tomato 3-4weeks, onions -5-6weeks pepper 4-5weeks.

iii. The Weather at Transplanting: - Favorable weather for transplanting is that which favours less transpiration (morning and evening period when the sun is not hot). The weather should be cool and humid and not sunny.
iv. Methods of Transplanting: - The procedure followed during transplanting determines the success or failure of the whole operation. It is essential that before uprooting seedlings, the nursery bed should be wet.

For quick recovery and good establishment the following points should be considered.

1. Healthy looking seedlings should be selected for transplanting. Discard wilted and over grown seedlings.
2. Transplant seedlings in the evening or during cloudy weather.
3. Uproot the plants carefully and use the hand trowel to lift the seedling with soil on the root.
4. Do not let seedling wilt. Keep them in the shade or in bucket of water after uprooting.
5. Make transplanting hole large enough and deep enough to receive the roots without damaging or bending them.
6. After setting, apply 100ml of a starter dose of fertiliser around each plant. This is preferred by dissolving about 10 g of N.P.K. (15 – 15 – 15) in a litre of water.
7. Firm the soil around the root to be sure there are no air pockets.
8. Water the seedlings very frequently to ensure good establishment. Water before 7:00 am and after 4:00pm.
9. Dust plant and the ground around them with a contact insecticide e.g Aldrin dust to prevent cutworms and cricket from cutting off the seedlings.

3.5 Nursery Tools and their Uses

Some important tools used in nursery are as follows:

1. Cutlass or Machete: Cutlass is used for clearing the nursery site. It may also be used for transplanting seedlings and digging holes.
2. Hoe: It is mainly used for making heaps, ridges and nursery beds. It is also very effective for turning up the soil, loosening the soil surface and to destroy weeds.
3. Hand Trowel: It is used for transplanting seedlings from the nursery to the field and for spreading manure and also for digging shallow holes on the beds.
4. Garden Fork: It is used for turning manure during compost making and for spreading manure in the open field. It is also used for loosening the soil before transplanting.
5. Digging Mattock: It is used for digging and uprooting small stumps
6. Rake: A rake is used for leveling soil surface and breaking large soil crumbs into small ones. It is also used for removing stones and weeds from seedbeds and for covering vegetable seeds when they are broadcast.
7. Garden Line: It is used for lining up beds and for making straight line when planting.
8. Watering Can: It is used for sprinkling water over young seedlings and for irrigation during dry season farming.
9. Tape: A tape is used for taking short or detailed measurement on the field.
10. Ranging Pole: It is used for marking surveyed stations or intermediate stations. It is also useful in marking straight lines

4.0 Conclusion

The success of crop production depends on the quality of seeds and seedlings used and the cultural practices employed in the production. Raising of seedlings in the nursery should be done in a careful manner and all necessary requirement should be met so as to produce healthy seedlings.

5.0 Summary

In this unit, you have learnt that a nursery is a place where young crop plants are raise under intensive management for later transplanting to the field. The reasons for nursery

practices are economy of seeds, protection of seedlings against pest and diseases, shade management etc. however, it has the disadvantages of high cost of establishment, high cost of labour and transplanting them direct seeding.

6.0 Tutor-Marked Assignment

1. Define transplanting
2. List the points to be considered for quick seedling recovery and establishment.
3. State the different types of portable nursery
4. State 2 advantages and 2 disadvantages of a nursery.

7.0 References/Further Reading

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