Practical manual

Plant Propagation and Nursery Management

Course No. HFS -103 Credit Hrs. 2(1+1)

For B.Sc. (Hons.) Horticulture II Semester students

Dr. Anjana Kholia
Dr. Ranjit Pal

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College of Horticulture & Forestry
Rani Lakshmi Bai Central Agricultural University, Jhansi – 284003

Syllabus:

Media for propagation of plants in nursery beds, potting and repotting. Preparation of nursery beds and sowing of seeds. Raising of rootstock. Seed treatments for breaking dormancy and inducing vigorous seedling growth. Preparation of plant material for potting. Hardening plants in the nursery. Practicing different types of cuttings, layering, graftings and buddings including opacity and grafting, top grafting and bridge grafting etc. Use of mist chamber in propagation and hardening of plants. Preparation of plant growth regulators for seed germination and vegetative propagation. Visit to a tissue culture laboratory. Digging, labelling and packing of nursery fruit plants. Maintenance of nursery records. Use of different types of nursery tools and implements for general nursery and virus tested plant material in the nursery. Cost of establishment of a mist chamber, greenhouse, glasshouse, polyhouse and their maintenance. Nutrient and plant protection applications during nursery.

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Session .....

Semester .....

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Date: Course Teacher

INDEX

Practical No. 1

Objective: Identification of tools and equipment used for plant propagation and nursery management

1. Observation to be recorded:

S. No.	Tool / Equipment Name	Uses	Diagram
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Practical No. 2

Objective: To study about media for propagation of plants

Material required: Soil, sand, FYM, coco peat, vermiculite, perlite, media preparing tools, pots

Media used for propagation of horticultural plants mainly consists of organic and inorganic components.

Procedure:

1) **Soil mixes:** ……..

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2) **Soil less media:** ……..

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Precautions: ……

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Write in brief:

a) Vermiculite: ……..

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b) Perlite: ……..

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c) Peat: ……

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d) Cocopeat: …….

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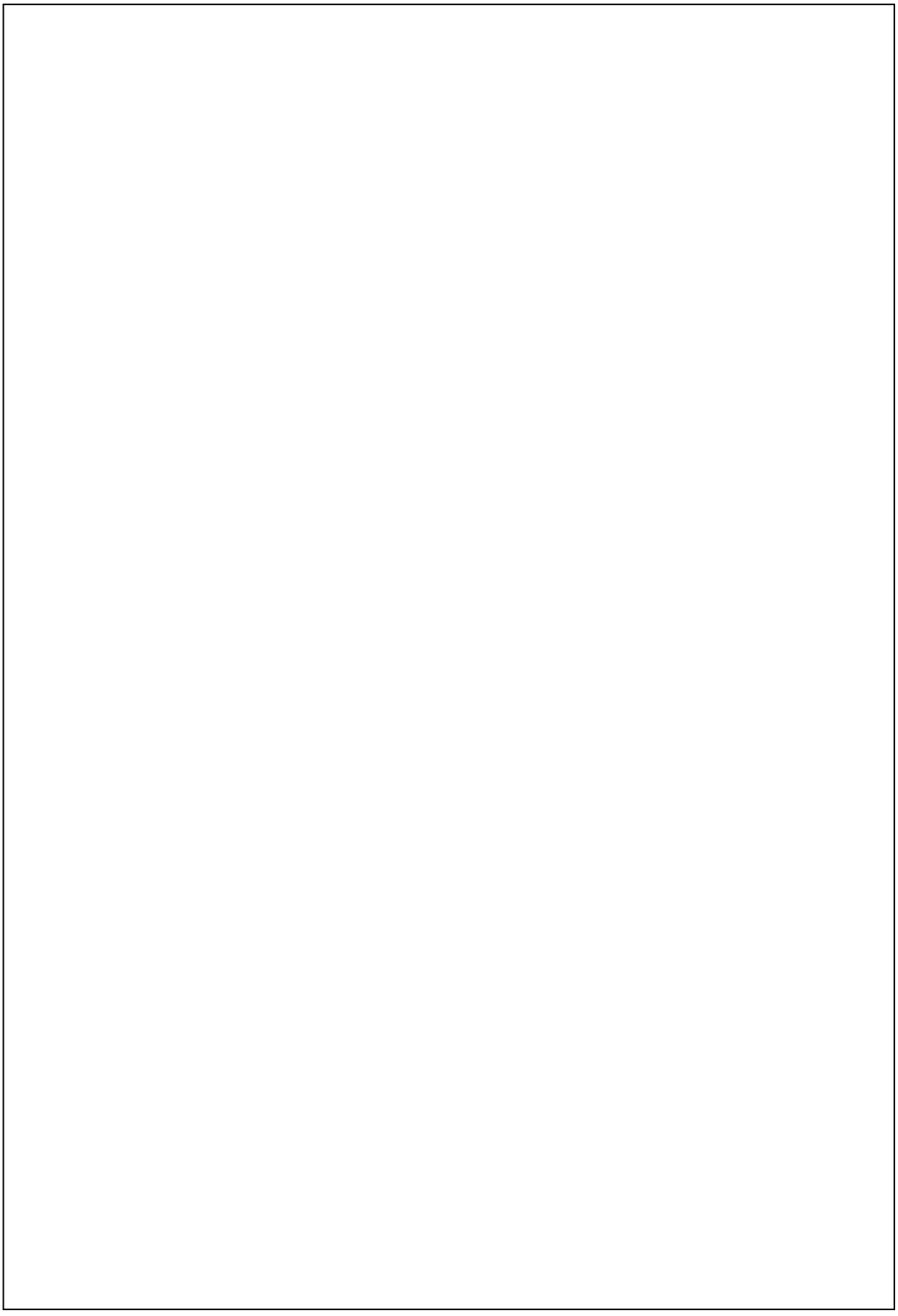
Practical No. 3

Objective: To study about preparation of nursery bed

Material required: Rope, Spade, hand leveller

Procedure: ……

Draw well labelled diagram of nursery bed



Practical No. 4

Objective: To study about scarification and stratification. How to overcome the seed dormancy?

Material required: Seed, hammer, acid, glassware, medium and refrigerator.

Stepwise procedure followed for Scarification: ……

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1. Observations:

S. No.	Type of Scarification	No. of seeds sown for germination	No. of seed germinated	Percentage of germination
1.	**Mechanical scarification**			
2.	**Chemical scarification**			
3.	**No scarification**			

Stepwise procedure followed for Stratification: ……

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2. Observations:

S. No.	No. of seed kept for stratification	No. of seeds sprouted	Percentage of sprouted seeds	No. of seed sown in bed germinated	No. of seed germinated	Percentage of germination

Practical No. 5

Objective: To study about different type of cuttings for propagation

Material required: Secateurs, knife, cutting and polybags

Procedure: ……

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1. **Observation to be recorded**

S. No.	Types of cutting	No. of cutting planted/made	No. of cutting rooted	Percentage of rooted cutting	Average root length
1.	Hard wood				
2.	Semi hard wood				
3.	Soft wood				
4.	Herbaceous				

Practical No. 6

Objective: To study about simple layering method

Material required: Knife, branches / shoots of suitable plants for practicing methods of vegetative propagation.

Procedure: ……

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Draw the well labelled diagram of simple layering

Practical No. 7

Objective: To study about serpentine layering method

Material required: Knife, branches / shoots of suitable plants for practicing methods of vegetative propagation.

Procedure: ……

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Draw the well labelled diagram of serpentine layering

Practical No. 8

Objective: To study about air layering/ gootee/ marcottage.

Material required: Knife, plastic strips, sphagnum moss, branches / shoots of suitable plants for practicing methods of vegetative propagation.

Procedure: ……

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Draw the well labelled diagram of air layering

Practical No. 9

Objective: To study about propagation through mound / stool layering

Material required: Knife, plastic strips, sphagnum moss, branches / shoots of suitable plants for practicing methods of vegetative propagation.

Procedure: ……

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Draw the well labelled diagram of mound/ stool layering

Practical No. 10

Objective: To study about propagation through grafting

Material required: Secateur, grafting knife, plastic strip, scion and stock.

Procedure: ……

Draw the well labelled diagram of different types of grating

Practical No. 11

Objective: To study about propagation through budding

Material required: Secateur, budding knife, plastic strip, scion and stock.

Procedure: ……

Draw the well labelled diagram of different types of budding

Practical No. 12

Objective: To study about lining out, digging and packing of plants from nursery

Material required: Nursery stock, Khurpi (Hand hoe), straw or burlap, jute thread, basket or boxes for packing, sphagnum moss.

Procedure: ……

Draw the well labelled diagram

Practical No. 13

Objective: To study about preparation and calculation related to PGRs.

Material required: PGRs, glassware, distilled water, solvents and weighing balance and pH meter.

Procedure: ……

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Calculation: .....

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Elaborate following terms

PGRs:

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Stock solution:

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Working solution:

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Practical No. 14

Objective: Visit to tissue culture laboratory

Material required: Tissue culture laboratory

1. **Write details of various tissue culture rooms/chambers**

   Media preparation room: ……

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   Inoculation room: ……

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   Growth Chamber: ……

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   Hardening room/glass house: ……..

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2. **Write in brief about the important uses of the following in tissue culture.**

   Refrigerator: ……..

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   Analytical balance: ……

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Autoclave: .....

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pH meter: .....

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Laminar airflow: .....

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Agar: .....

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PGRs: .....

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Surface sterilants: .....

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Precautions to be followed while working in a tissue culture lab

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3. **Explain the following terms:**

Explants

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Callus

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Subculture

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Transfer

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Plantlets

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In-vitro

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Ex-vitro

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Hardening

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Practical No. 15

Objective: To study about use of mist chamber for propagation and hardening of plants

Materials required: Mist chamber

Mist propagation units: ……

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Control mechanisms of mist:

Timer: ……

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Electronic leaf: ……

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Thermostat: ……

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Screen balance: ……..

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Photoelectric cell: ……..

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Hardening of plants in mist chamber:

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Precautions: ……

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Practical No. 16

Objective: Layout of commercial fruit nursery

Draw layout of commercial fruit nursery

Elaborate the following terms:

Mother block: ……

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Potting house: ……

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Seedling block: ……

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Stool bed: ……

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Seed store: ……

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Packing house: ……

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Wind breaks: ……

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Nursery Store: .....

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Nursery Bed: .....

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Pump House: .....

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Practical No. 17

Objective: Maintenance of nursery records.

Materials required: Registers, chronological operation record, nursery map.

Procedure:

1. Some records are essential if nurseryman is to plan his nursery for remunerative returns and establish as a reputed enterprise.
2. A nursery planner should know how long it takes to lift saplings or how much seed is required, or how much cuttings he can accommodate in a glasshouse or how much scion wood is required for grafting a particular plot of nursery.
3. There must be specific register for specific selected activities to keep day to day or pedigree or operation records in nursery.
4. These records are required by law to satisfy inspecting authorities, tax calculation, detect or discourage theft in case of big nurseries. The important aspects for which maintenance of record is necessary are as under:

Progeny orchard record: ……

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Nursery layout record: …….

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Cultural operations record: ……..

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Disposal register: ……

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Advisory/visitor register: ……

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Precautions: ……

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Practical No. 18

Objective: Visit to commercial Nursery

Material required: Commercial nursery

Report of the visit:

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APPENDIX

Solvents for dissolving plant growth regulators			
S. No.	**Group**	**Name**	**Solvent (s)**
1.	Auxins	IAA, 2,4-D	Water
		IBA, NAA	EtOH, 1N NaoH
2.	Gibberellic acid	GA_3	EtOH
3.	Cytokinins	6-Benzylaminopurine (BA), Kinetin, Zeatin	1N, NaOH
4.	Ethylene	Ethrel	Water
5.	Abscisic acid	ABA	1N NaOH