Course: B. Sc (Hons.) Botany
Semester: IV
Paper: Medicinal Botany (SEC)
Topic: Propagation of Medicinal plants: Objectives of Nursery, Classification, Important components of a nursery

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Medicinal plants are a valuable source for herbal medicines and drugs.

Propagation of these plants is important to protect and conserve the endemic and endangered plants.

The desired bioactive compound should be present in the herbal drug, hence, outsourcing of right propagules is the most important step for large scale propagation.

Plants can be propagated in two ways:

i) through seeds: which is the best source of germination, also dependent on environmental factors and

ii) vegetative parts: rhizome, runner, stolon, bulbs, tuber, stem cutting, corms, leaf cutting etc. done through layering, grafting and budding.
Some of the common medicinal plants propagated include:

- i) *Aloe vera* through suckers or offsets which are separated from the mature plant and transplanted.
- ii) *Atropa belladonna* through seeds, shoot cuttings or root cuttings, also by sprouting old root stocks.
- iii) *Withania somnifera* (Ashwagandha) through seeds.
- iv) *Curcuma longa* (turmeric)-whole or split rhizome.
- v) *Zingiber officinale* (ginger)-seed rhizome.
Things to consider for propagation

- Selection of site for nursery
- Construction of green houses
- Soil mixes
- Successful germination
- Proper equipments
- Natural plant protection measures
Nursery

- A nursery is a managed site designed to produce high quality, disease free seedlings by providing favourable conditions till they are ready for planting.

- It can be considered as a tool for conservation of endemic and endangered medicinal plants and also improving the management of plants used in traditional medicine.
Classification of Nursery

On the basis of their irrigation facility/moisture content:

i) Dry nursery: maintained without irrigation or any artificial watering
ii) Wet nursery: with irrigation or watering during dry periods.

On the basis of duration of their use:

i) Temporary: maintained for supplying stock for a short period normally made near the plantation sites, rich in humus, therefore require less manuring.
ii) Permanent: maintained permanently till seedlings can be raised at a reasonable cost, larger, has facilities for irrigation and manure
Objectives of Nursery

- Sowing seeds of plants which do not set their seeds every year and raise their seedlings and plant in various years.
- To raise slow growing species to protect from the weeds and transfer them once they are ready for plantation.
- Planting of tall, sturdy trees for roadside avenue plantation can be achieved through nursery.
- Transplantation through seedlings proved more successful as compared to when raised by direct sowing.
- Introduction of exotic species, Eucalyptus, Poplar, tropical pines etc can be done only by planting in nurseries.
Components of a Nursery

• A nutrient rich/medium soil site which is near to water source, free from soil pathogens and insects is necessary.

• Cheap and skilled labors should be readily available and should have good access to the main road for easy transportation.

• The site should be on gently sloping area and away from other tall crops for good drainage as well as to encourage air circulation.

An appropriate site must be selected for the most effective, efficient, and economical design of a nursery.

The purpose and the plant to be propagated will decide the site selection and its improvement.

Careful observation of site conditions and an assessment of past and present climatic records are important. If desired, a list of potential nursery sites are made and compared using a decision matrix.
Layout:

No standard layout but should be based on the needs, resources and requirements.

- A water tank/pond
- Seed and fertilizer store room
- Germination/mother bed area
- Potting/container filling area
- Seedling raising area
- Worker/mess hall
- Office room
- Propagation structures
- Compost areas
- Beds arranged in a series with pathways between them.
Containers consisting of polybags, clay pots or iron material.

Nursery media- soil to hold the seedlings or propagules during rooting, sand in mother beds and vegetative propagation.

Vermiculite for cuttings and sphagnum mass for air layering, peat moss, saw dust, coco peat, grain husk are other media used.

Soil pH between 5.5 to 6.5
Propagules

- Seeds
- Cuttings
- Rootstock
- Scion
- Explants
Water for irrigation and

Fertilizers for major and minor nutrients

Pesticides

Fungicides

Herbicides

Growth regulators
**Tools:** Axes, crow bar, wheel barrows, boxes, plastic buckets, watering cans, wire cutters, digging forks, hammers, nails, hoes, scissors, saws, budding and grafting knives, tapes, trays, khurpi, spade, iron pan, forks.

**Electricity:** for providing controlled environment and operating machineries.

**Equipments:** tractors, water tankers, filling machines, grafting machine.

**Labour:** skilled labour
Input Management

- Water and nutrients for proper growth of the seedlings
- Proper solarization of media, mixer media preparation, container filling, well decomposed farm yard manure (FYM) for minimum input cost.
- Mother beds: seed sowing beds with fertile and clean nursery mixtures (soil, sand and FYM). Rectangular in shape, 1-1.8m width and 1.8 (hills) to 12m (plains) length. Lengthy side of the bed towards the sun for shading.
  - Types: Raised and Sunken beds
    - Raised-prepared by dumping soil about 10-15cm above the ground level to prevent water logging, suitable for plants which require less water for germination. Eg. Teak.
    - Sunken-prepared by excavating the soil in bed area, 10-15cm deeper than normal ground level, prevents outflow of water and conserves moisture. Seeds with hard coats such as Acacia, Acer etc.
  - Level beds-surface flat with stones, bricks placed at edges of bed to prevent crumbling
  - Germination bed, transplant bed, storage bed, seedling bed and cutting bed for seedling stock preparation.
For propagation of plants a glass/green house is constructed where the plants can be grown under partially controlled environment. It may be a shade net house, natural green house, glass house or a poly house.

May be designed according to the requirements.