

JOB ROLE – GARDENER

Sector – Agriculture

(Qualification Pack Code: AGR/Q0801)

PPT's for Class XI



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UNIT 3: PLANT PROPAGATION

Session 1: Plant Propagation by Cutting

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Session Objectives

The student will be able to :

- Describe plant propagation.
- Demonstrate plant propagation by cutting.

Introduction

Plant propagation in simple words may be defined as multiplication or reproduction of plants. Commercialisation of crops leads to the development of various techniques and procedures of plant propagation. Each technique has its own merits and demerits.

Plants can be propagated by sexual and asexual means. Sexual means includes propagation by seeds, while asexual propagation is based on the utilisation of vegetative parts of plants for raising new ones. Vegetative parts of plants like shoots, leaves, roots, stem, buds and underground parts are used in different ways for reproducing new plants.

Types of Propagation

Sexual propagation:

Propagation or multiplication of plants by seeds is known as 'sexual propagation'. Seeds are formed as a result of successful fertilisation and combination of parental gametes.

Merits of sexual propagation

- Plants propagated by seeds live longer, are vigorous and more resistant to biotic (insect-pests and diseases) and abiotic stresses (environmental conditions).
- It is an easy, simple and convenient method of plant propagation.
- A large number of rootstocks for budding and grafting purpose is also raised by this method.

Types of Propagation

Demerits of sexual propagation

- Sexually propagated plants show variations and are not genetically true-to-type.
- Plants that are propagated through seeds have long gestation period, which results in delayed flowering and fruiting.
- Plants grow vigorously and cause obstruction in practices like harvesting and spraying.
- Advantages offered by rootstocks and scion as in asexual propagation cannot be exploited through sexual method.

Types of Propagation

Asexual propagation

It is also called 'vegetative propagation'. The vegetative parts of a plant like leaf, stem, root or their modified forms are used for propagation. Most of the horticultural crops are commercially propagated by vegetative or asexual method of propagation.

Merits of asexual propagation

- Many fruit and ornamental plants that do not produce seeds are multiplied by this method.
- Plants propagated by asexual propagation are true-to-type genetically.
- Maturity is uniform and the plant gives quality yield.
- Plants propagated by asexual method are small in size, so spraying of chemicals and harvesting are easy.

Types of Propagation

Demerits of asexual propagation

- By vegetative propagation, new varieties cannot be developed.
- It requires specialised skills, so it is an expensive method of propagation.
- The life span of asexually propagated plants is short as compared to sexually propagated ones.
- These plants are more prone to biotic and abiotic stresses.

Cuttings and Its Types

Cutting

Cutting is a detached vegetative part of a plant, which on separation and planting is able to regenerate the missing parts and develop itself into a new plant. The method is named after the part of plant used for cutting, *e.g.*, stem, root and leaf.

Stem cutting

Based on the age and maturity of shoots detached for vegetative propagation, stem cuttings is of four types.

- (i) Hardwood cutting
- (ii) Semi-hardwood cutting
- (iii) Softwood cutting
- (iv) Herbaceous cutting

Cuttings and Its Types

Stem cutting

1. Hardwood cutting

Such a cutting is taken from woody plants. Mostly, deciduous plants are propagated by this method. One-year old mature branch is cut into pieces of suitable sizes and planted in the rooting medium, e.g., rose, grapes, fig.



Cuttings and Its Types

1. Hardwood cutting

Procedure

- Select one-year old (10-15 cm length) branches having pencil thickness from healthy plant.
- Each cutting must have at least 4-5 cm dormant vegetative buds.
- A cut is given at the base of the cuttings just below the node and a straight upper cut is given away from the top bud.
- The cuttings are planted slant-wise in a nursery bed or small poly bags for growing plants.
- The best season for planting the cuttings is monsoon for evergreen plants and November–February for deciduous plants.

Cuttings and Its Types

2. Semi-hardwood cutting

A semi-hardwood cutting is taken from 4 to 9-month old shoots of current season woody plants. Ornamental plants like *croton*, *acalypha*, are propagated by semi-hardwood cuttings.



Cuttings and Its Types

2. Semi-hardwood cutting

Procedure

- Semi hardwood cuttings are prepared from branches having pencil thickness with the length of 7.5 to 15 cm.
- The cuttings must have at least 4-5 dormant vegetative buds. Some leaves are retained as they help in preparing food by photosynthesis.
- Dip the top of the cutting in wax to prevent transpiration and infections.
- Treat the cuttings before planting in IBA @ 5000 ppm induces roots early.
- Planting of the cutting in pot or bed.

Cuttings and Its Types

3. Softwood cutting

Such a cutting is taken from herbaceous or succulent plants. Shoots of 2 to 3-month old plants are selected for softwood cuttings such as *alternanthera*, *coleus*, *duranta*, *clerodendrum*, etc.



Cuttings and Its Types

3. Softwood cutting

Procedure

- Softwood cuttings are prepared from tender but mature branches.
- The length of these cuttings varies from 10–12 cm.
- Tender shoots do not have sufficient food material. Hence, all leaves present on the shoots are retained for photosynthesis.
- The cutting material are gathered early in the morning and must be kept moist by keeping them in a wet cloth.
- Sandy loam medium is the best for planting softwood cuttings.

Cuttings and Its Types

4. Herbaceous cutting

Such a cutting is taken from herbaceous plants. Shoots of 1 to 2-month old plants are selected for herbaceous cuttings. Examples are chrysanthemum, *iresine*, *pilea*, dahlia, petunia, carnation, marigold, etc.



Cuttings and Its Types

4. Herbaceous cutting

Procedure

- Herbaceous cuttings are made from tender succulents, especially the leafy part of the stems of herbaceous plants.
- Terminal, measuring 8–12 cm, of a healthy shoot is cut and the basal leaves are removed, leaving the upper leaves undisturbed.
- The cuttings once detached must not desiccate at the cut and are rooted well under mist.
- The application of auxins promotes the regeneration of adventitious roots. Sandy loam medium is the best for planting herbaceous cuttings.

Leaf Cutting

Selection of cutting

Plants with thick fleshy leaves having buds are propagated by leaf cutting. Vegetative buds are present in the notches of leaf margin (*bryophyllum*) or on the vein (*begonia rex*). Leaf blade or pieces of it with bud are put on the rooting medium under favourable conditions. Plants like snake plant (*senseveria*), *rhododendron* and *bryophyllum* are propagated by this method.



Summary

In this session you have learnt about the plant propagation, cutting and its types.

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