Class Notes	
Class: XI	**Topic: Plant Propagation methods & classes of seed**
Subject: AGRICULTURE	

Plant Propagation

Definition:-Plant propagation can be defined as controlled reproduction of a plant by a man in order to perpetuate a selected individuals, or group of individuals which is having specific values to him.

A. **Sexual Propagation in Plants:-**Multiplication of plants by using seed is called as sexual propagation.

Advantages:

- It is easy and chip method of propagation.
- They are hardy for adverse environment condition and insect-pest or diseases with deep root system.
- Sexual propagation lead to genetic variability, it is essential for development of new varieties development. The polyembryony phenomenon of propation of more than one seedling from a single seed, produce true to type, nuclear embryonic seedling which could be used as rootstock for uniform performance. E.g. South Indian mango variety, citrus and Jamun.
- Seed propagation is necessary when vegetative propagation is unsuccessful or expenses e.g. papaya, coconut, phalsa and Areca nut.
- Roots stocks are usually raised by seed e.g. Rangpur lime and Jamberi for citrus.

Asexual Propagation in Plants:- Asexual propagation or vegetative propagation refers to the multiplication or perpetuation of any plant from any vegetative parts as plant other then the seed.

Advantages of Vegetative Propagation:-

- The progenies are true to type like mother plant.
- Vegetative propagation is the only alternate where no seed is formed or germination of seed is very slow or no viable seed is formed. (e.g. Banana, Pine apple and roses, seedless grape).
- Certain rootstock has the capacity of resisting or tolerating the adverse environment factors such as frost and adverse soil factors like salinity or alkalinity. E.g. frost resistance, for cirus trifoliate (Trifoliate orange). Rangpur lime.

Method of Asexual Propagation:-

A. **Layering:-** Layering is the development of roots on a stem while it is still attached to the parent plant. The rooted stem is stem is then detached to become a new plant growing on its own roots. Thus rooted stem stem is known as layer.

Method of layering:-

1. Simple layering:- In this method a branch is bent to the ground and some portion of it, is covered by soil leaving the terminal and of the branch exposed. Root initiation takes place at the buried portion. After the root initiation. i.e. after allowing sufficient time the layer is separated from the mother plant by cutting the layered shoot. E.g. Buganvilia, jasmine, calodendron etc.

2. Tip layering:- Tip layering is similar to simple layering and happens naturally with plants such as black raspberry and trailing blackberries. The tip of a branch touches the ground and roots form. Tip layering simply mimics this natural process. To tip layer, dig a small hole several inches deep, insert the tip of a current season's shoot or cane, and fill around it with soil..

3. Compound layering/ Serpentine layering:- If there is a particularly long and healthy stem, you may want to consider compound layering. This works in precisely the same way as simple layering except because the stem is long, you are able to bury more than one section, potentially giving you multiple clones from one stem. Eg.- Jasmine and strawberry.

4. Mound layering/Stooling:-In this method a plant is cut back at the ground during the dormant season, and soil is covered at the base of the newly developing shoots. After allowing sufficient time for root initiation, the rooted shoots are separated and taken as individual layers

5. Air layering/Chains layering/ Marcottage layering:-In air layering, roots, from on an aerial shoots. The rooting medium will be tied to the shoots for getting root initiation. Best rooting medium for air layering is sphagnum- moss as it holds large amounts of water so as to supply moisture to the layered shoot till

proper root initiation takes place. Eg- Citrus, Pomegranate, sfig, guava.

B. Cutting:- Cutting is a method of asexual propagation in which a portion of any vegative part such as stem, leaf or root is cut from the parent plant and is placed under favorable environmental condition to form roots and shoots, thus producing a new independent plant.

Stem Cutting: This is the most important type of cutting and can be divide into three types based on the nature of the wood used in marketing the cutting.

i) **Hard Wood Cuttings:-** E.g. Grape, pomegranate, fig, mulberry, Acalypa, Rose, Bougainvillea etc. This is last expensive and easiest method. Hard wood cuttings are not readily perishable and may be shifted safely over long distance, if necessary. The cutting usually prepared during the dormant season and from the wood of the previous season growth. Length:- 20-25cm (22.5cm), Thickness:- 0.5-1.0 cm.

ii) **Semi hard Wood Cuttings:-** E.g. Eranthemum, pomegranate, fig. The cuttings are prepared from now shoot just after a flush of growth which is partially matured. Length:- 20-25cm (22.5cm), Thickness:- 0.5-1.0 cm.

iii) **Soft Wood Cutting:-** E.g. Coleus, pilea, alternanthea, Bignonia, Chrysanthemum, Colliose, Geranium, Guava etc. these types of cuttings are also made from succulent, herbaceous green plants such as carnation, portulaces, etc. These cuttings are always made with leaves attached to stem.

C. Tissue culture

It is a technique of growing cells, tissues, organs or whole organism in vitro (in glass) on artificial culture medium under aseptic and controlled conditions. It is rapid vegetative propagation of several agricultural and horticultural crops. It replacing the conventional methods of propagation. The mass multiplication of agricultural, horticultural, medicinal and other desirable plants by tissue culture techniques is known as micro propagation/clonal propagation.

Types of tissue culture: Meristem culture, pollen culture, shoot tip culture, Embryo culture, Anther culture.

Steps followed in tissue culture technique

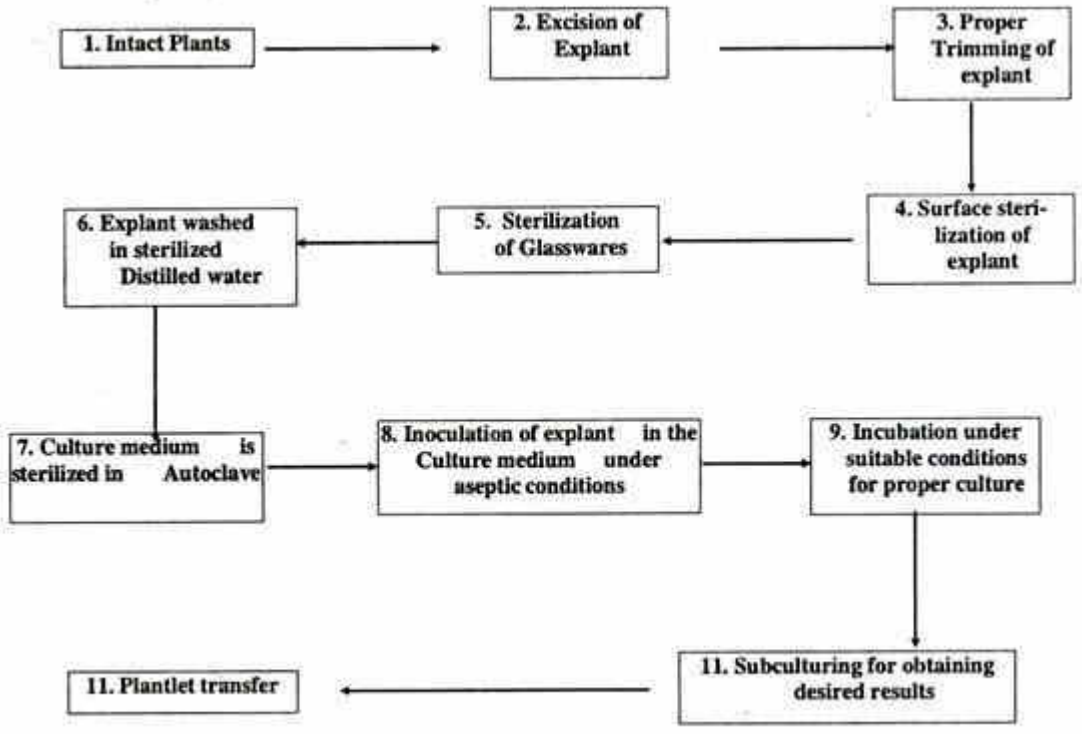
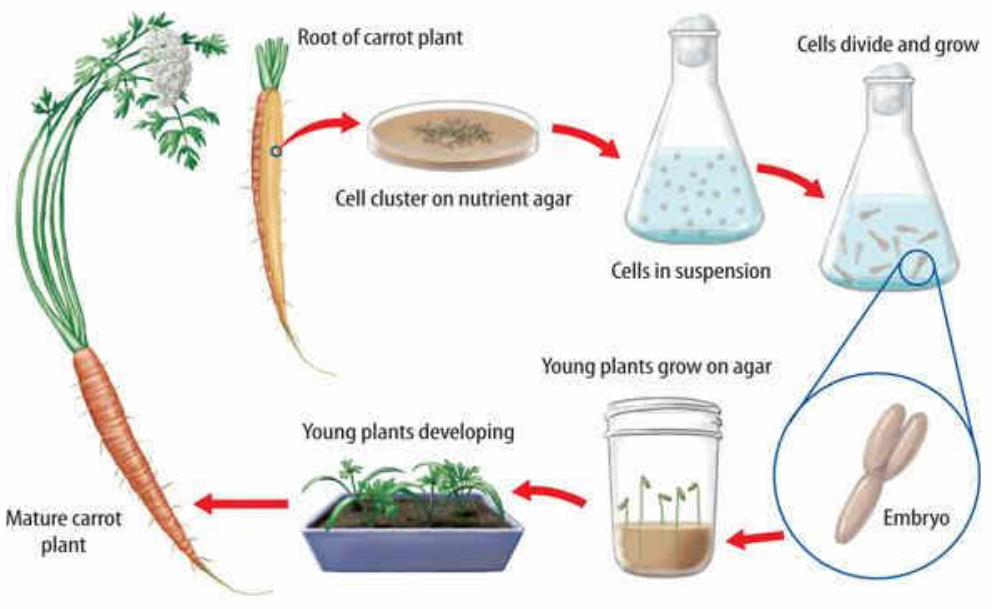


Fig. 1. Steps in general technique of Plant tissue culture.



Embryo culture of carrot

Classes of seed

Nucleus seed:- This is the 100% genetically pure seed with physical purity and produced by the original breeder/Institute /State Agriculture University (SAU) from basic nucleus seed stock. A pedigree certificate is issued by the producing breeder. It is not sold in Market.

Breeder seed:- The progeny of nucleus seed multiplied in large area as per indent of Department of Agriculture and Cooperation (DOAC), Ministry of Agriculture, Government of India, under supervision of plant breeder / institute / SAUs and monitored by a committee consisting of the representatives of state seed certification agency, national / state seed corporations, ICAR nominee and concerned breeder. This is also 100% physical and genetic pure seed for production of foundation seed. A golden yellow colour certificate is issued for this category of seed by the producing breeder.

Foundation Seed:- The progeny of breeder seed produced by recognized seed producing agencies in public and private sector, under supervision of seed certification agencies in such a way that its quality is maintained according to prescribed field ad seed standards. A white colour certificate is issued for foundation seed by seed certification agencies. It has 98% genetic purity.

Registered seed:- It is a progeny of foundation seed. It is not prepared in India. It has purple colour tag.

Certified seed:- The progeny of foundation seed produced by registered seed growers under supervision of seed certification agencies to maintain the seed quality as per minimum seed certification standards. A blue colour certificate is issued by seed certification agency for this category of seed.

Truth Full Labelled Seed:- It is the category of seed produced by cultivators, private seed companies and is sold under truthful labels. But field standard and seed standard should maintain as per seed act and certified seed stage. Under the seed act, the seed producer and seed seller are responsible for the seed.

Note: This content has been prepared at home.