S.G.V.C Vidya Prasarak Trust's

M.G.V.C ARTS, COMMERCE AND SCIENCE COLLEGE
MUDDEBIHAL-586212

DEPARTMENT OF BOTANY

CERTIFICATE

Examination Seat No: S1827630 **Class:B.sc 5th sem**

This is to Certify that, Mr/Mrs. ASHA LAMANI

Has satisfactorily completed Project work on" PLANT BREEDING

"Under my supervision in M.G.V.C Arts, Commerce and Science College Muddebihal year 2020-2021

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Project work on :

Plant breeding.

Topics:-

*Hybridisation:

*Interspecific:

*Intergeneric:

*Mutation:

*Polyploidy breeding:

Hybridisation:

Hybridisation is one of key method of crop improvement, It is applicable to both self and cross pollinated crops. The main purpose of hybridisation is to create variation

Hybridisation is the method of producing crop varieties in which two or more plants of unlike genetic constitute are crossed together.

Types of Hybridisation:

Hybridisation may be classified into two different categories:

1)Interspecific hybridisation

2)Intergeneric hybridisation

1)*Interspecific hybridisation:*

The plants of two different species belonging to the same genius are crossed together this hybridisation is between the species and with in the same genius and is therefore it is also know as intraspecific hybridisation.

The hybridisation is commonly used for transferring the genes of disease insect pests and drought resistant from one species to another.

- Most of the disease and pest resistant verities of wheat,tomatoes and sugarcane, have been evolved from this method.

All the interspecific hybrids of two homozygous plants are uniform because of their identical genetic constitution.

2)*Intergeneric hybridisation:*

The crosses are made between the plants belonging to two different genera example- Raphanobrassica,Rabbag,Sugarcane are few examples of this type of crossing. It is usually used for transferring the characters like disease, insect and drought resistance from wild genera into the cultivated plants,

Hybrids produced from this method are of little or no agricultural importance except of scientific interest.

*Hybridisation techniques:

Various steps involved in the process are:

1)Selection of parents:

This is the first step in hybridisation is to select plants which are to be used as parents and supply all the desirable important characters must be chosen with the great care. AS far as possible the parents must be chosen from the collection which are supposed to suited conditions.

2)Selfning of parents:

This is the second step of artifice self pollination of parents. It is very essential for eliminating. The undesirable characters and obtaining the in breeds.

The inbreeds are usually very weak, stunned growth and low in yield can not be released directly as new improved varieties therefore they are combineto

3)*Emasculation:* **This is the 3rd step in the hybridisation technique. Emasculation is defined as the removal of stamens from the female parents before they burst and shed their pollen.**

***The process of emasculation is prevent self fertilization therefore isusually performed a few hours before the anthers ripe and Denise and self-pollinate the stigma. The floral buds which are expected to open on the following day are selected for the process of emasculation**

4)Bagging:

This is the fourth step and before the stigma receptivity and dehiscence of anthers in unisexual plants both male and female flowers are bagged separately to a void the contamination in staminage flowers and cross pollination in the

pistillate flower .The bags are keept on the female plants till the seed setting. But in male plants the bags are removed as soon as the crossing is over.

The bags are made up of different materials such as paper, polyethylene,cloth,plastic parchment the size of the bag is according to the size of the flower of crop.

It is also necessary to puncture the bags with number of holes to provide ventilation and to prevent moulds development in the bags and the bags are tided with the thread or Cooper wires

5)*Crossing:*

It is the fifth step. It is the artificial cross pollination between the genetically unlike plants. The process consists of collecting the viable pollens or anthers from the desired male parent and transferring them on the stigma of desired or emasculated female parents. The bags are temporarily removed from the female parents and the collected pollens dusted on the stigma after crossing the flowers are again bagged.

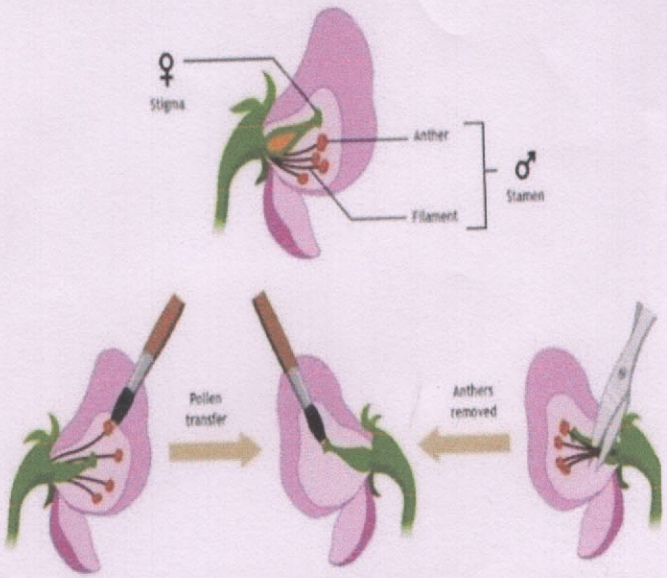

Fig showing cross pollination on an emasculated flower.

*Labelling:

The cross flowers are properly tagged and labelled on some what hard paper. They are tagged to bags with the help of threads.The labelling paper should been complete information like.

*Number referring to the field records.

* Data of emasculation.

* Name of the female and male parents.

6)Harvesting hybrid seeds and rising F1 generation

This is the sixth step in which the bags are removed and the crossed heads of desirable characters are harvested and the seeds are collected after complete drying they are threshed individually and preserved up to neat season.

These seeds are separately to rise the F1 generation are the progenies of crossed seeds hence it is called hy brids.

*Advantages of Hybridisation:

1)Creation of heritable variation

The crossing of unlike individuals gives rise to entirely new plants showing variations in their characters as compared to their parents such variation are heritable and source of evolution in plant kingdom.

*Disadvantage of hybridisation:

* It is tedious time consuming and expensive Hybridisation process need a high technical training and practical experience for production of new variety a minimum 15years time is consumed hence it is time consuming and painting tasks.

MUTATION BREEDING:

Mutation: Mutation is a sudden heritable change in a characteristics of an organisms.

Mutation breeding sometimes referred to as " variation breeding " is the process of exposing seeds to chemical or radiation in order to generate mutates with desirable trails to be bread with other cultivars. Plants created using mutagenic seeds

* The term mutation was introduce by Hugo do vries in 1900.But mutation were know to occur in animals and plants.

Process of mutation:

There are different kind of mutagenic breeding such as using chemical mutagens like.

1)Ethyl methane sulfonate

2) Dimethyl sulphate

3)Radiation to generate mutants

Mutation breeding is commonly used up to produce fruit crops such as larger seeds new colours or sweeter fruit ,that either cannot be found in nature or have been lost during evolution.

Types of Mutation:

1)Spontaneous mutation: Mutation occurs in natural population. It may be by the injuries, disease and insect attack temperature these mutation are very common and occur at low rate in nature cine in 1laksh.

2) Induced mutation: It may be artificially induced by various mutagenic ag.

Induced mutations are 2types :

i)Maro mutation: Mutation with distinct morphological changes in the phenotype.

ii)Micro mutation: Mutation with invisible phenotype changes.

*Advantage :

1)Mutation produced inexhaustible variation.

2)It improve disease resistant in crops.

3) It is very effective in eliminating undesirable characters from the plants.

4)For the production of novel trails.

*Disadvantage:

1)Mutation breeding work is confined to a few institute where irradiation facilities and trained person are available.

2)Most of the mutations are recessive.

3)The frequency of desirable mutation is very low.

4)The breeder has to screen large population to select desirable mutations

POLYPOIDY BREEDING:

Polyploidy is a condition which the cells of an organisms have more than two paired (homologous) set of chromosomes.

*Most species whose cells have nuclei are diploid meaning they have two set of chromosomes one is inherited from each plants .Some organisms are polyploidy and polyploidy is especially common in plants.

*Polyploidy may occur due to abnormal cell division either during mitosis or commonly during metaphase1 in meiosis.

*In addition it can be induced in plants and cells cultures by some chemicals eg- Calchicine.which can result in chromosome doubling.

*Polyploidy type labelled according to the number of chromosome set in the nucleus.

Classifications :

Autopolyploid: Autopolyploid are polyploidy with multiple chromosomes sets derived from a single taxon. Rarely Autopolyploids arise from spontaneous, somatic genome doubling, which has been observed in apple bud sports. This is also the most common pathway of artificially induced polyploidy, where method such as protoplast fusion or treatment with colohicine,mitotic inhibitors are used to discreept normatic division which results in the production of polyploidy cells

* Application of Autopolyploidy in crop improvement:

*Monoploids are weaker than diploid and are little agricultural value.

*They used for developing homozygous diploid lines.

*Triploid -These are formed by the hybridisation between tetraploids(4n) and(2n) diploid they are generally highly sterile, the triploid do not produce true seeds all most all the seeds are small. This feature is useful in the production of seedless watermelons and some times they may be more vigorous than normal diploid

*Allopolyploidy: Allopolyploidy or amphipolyploids or hetero polypoids are polypoids with chromosomes derived from two or more diverged taxa.

Allopolyploidy: Allopolyploidy or amphipolyploids or heteropolypoids are polyploidy with chromosomes derived from two or more diverged taxa.*Allopolyploidy have genomes from two or more species. Some success has been obtained as is evident from the