

Exercise 12

Aim: To perform emasculation, bagging and tagging for controlled pollination

Principle: Conventional plant breeding programmes involve bringing under human control reproductive processes that lead to seed and fruit formation. For this controlled pollination is desirable using male and female parent having desired traits. One of the process that can be easily brought under human control is **emasculation**. For this the knowledge of flower structure, mechanism of pollination, fertilisation and physiology of flowering is essential for this. In emasculation technique the stamens are removed before anthesis to obtain female parent and pollen from the desired male parent is transferred on to its stigma.

Requirement: Ornamental plants/ wild plants bearing large bisexual flower, magnifying lens, tweezers, small sharp scissors, brush, alcohol, rubber bands, paper bags, paper clips and tags

Procedure

- (i) Select a flower in bud condition where anthesis has not occurred. Open the bud carefully and remove the stamens (Fig. 12.1). Mark this as female parent plant.



Fig. 12.1 Showing process of Emasculation

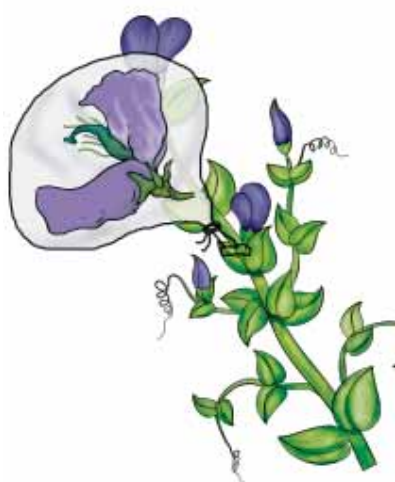


Fig. 12.2 Bagging of an emasculated flower



Fig. 12.3 Showing cross pollination on an emasculated flower

- (ii) Cover the emasculated flower with a plastic bag to protect it from undesired pollen (Bagging) (Fig. 12.2). The bag should be held securely in place with a paper clip / string / thread. Select the size of bag in accordance with the flower size. Bags must be transparent with minute pores.

- (iii) Bring into physical contact anthers of a desired male plant containing mature pollen grains with the stigmatic surface of emasculated female flower (Fig. 12.3). Use tweezers / brush if necessary to dust the stigmatic surface with pollen.
- (iv) Cover the pollinated flower again with the bag immediately. For identification, label the female parent (Tagging). Each pollinated flower should bear a label containing the name of the seed parent, the letter X (to signify a cross), the name of the pollen parent, and the date on which the cross was effected.

Questions

1. Why is emasculation performed before anthesis?
2. What are the advantages of using a bag containing minute pores?

Exercise 13

Aim: Staining of nucleic acid by acetocarmine

Principle: Acetocarmine combines with nucleic acid present in the nuclei of cells to form a deep red conjugate.

Requirements: Onion bulb, onion root tips, 2 to 4% acetocarmine/acetoorcein stains, slide and coverslips, brush/needle, pair of fine scissors, filter paper and microscope

Procedure

- (i) Peel off epidermis from the fleshy leaf of onion and put it on a slide. Add a few drops of water over it to avoid desiccation.
- (ii) Cut out a small piece (about 0.5 cm size) of the epidermal peel and discard the remaining portion.
- (iii) Wipe out the water with a filter paper.
- (iv) Put 2 drops of acetocarmine on the epidermal peel and heat gently on a spirit lamp.
- (v) Apply a coverslip over the peel avoiding air bubbles and wrinkles of the material.
- (vi) Wipe out the excess stain with help of blotting paper.
- (vii) Examine the material under low magnification of a microscope.

Observation

Record your observations with regard to shape of cell, the number of nuclei and their position in the cell. Draw a diagram based on your preparation and label its parts.

Discussion

Nuclei in cells are extremely rich in nucleic acid which exist in a conjugated form with protein to form nucleoproteinous structures, called chromatin fibres/chromosomes.

Questions

1. What are the building blocks of the nucleic acid?
2. What is DNA and how is it different from RNA?
3. Name different nitrogenous bases present in the nucleic acid.