

Experiment no. 6: Practice on meiotic cell division

Aim: Study of different stages of meiosis

PRINCIPLE:

Meiosis cell division studies mainly in reproductive cell that can be found rapidly in mature onion buds. The anthers can be prepared and squashed in a way that allows them to be flattened on a microscopic slide, so that the chromosomes of individual cells can be observed easily. The super coiled chromosomes during different stages of meiosis present in the anther cells can be visualized by treating with DNA specific stains, like Acetocarmine.

MATERIAL REQUIRED:

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|----------------------|-------------------|--|
| 1. Onion bud | 2. Acetocarmine | 3. Dropper |
| 4. Needle | 5. Forceps | 6. Razor blade |
| 7. Watch glass | 8. Brush | 9. Dissection probe with wooden back |
| 10. Light Microscope | 11. Canoy's fluid | 12. Microscopic slides and cover slips |

PROCEDURE:

Fixation

Flowers buds are fixed in canoy's fluid (1 part acetic acid: 6 parts ethyl alcohol). The amount of fixatives must always be at least 10 times more than the volume of the plant tissue. After 48 hours, the material is transferred and preserved in 70% ethyl alcohol.

Staining

Wash the material with double distilled water twice. Remove the anthers from flowers buds. Keep an anther on a clean glass slide in a drop of acetocarmine. Squash it with the help of flattened needle and remove the empty anther sac. Place a glass cover slip over the smear.

Smearing

Keep the glass slide in between the folds of blotting paper and apply uniform pressure over it with thumb. Add a few drops of acetocarmine stain from the slides of coverslip carefully, without disturbing the coverslip and allow it to dry.

Observation

Place the glass slide under a microscope and observe the various stages of the meiotic cell cycle. If the cells are of desired stage, the cover glass is sealed with paraffin wax temporarily. This can then be made permanent as per method given below.

Making of permanent slide

1. Wax is removed carefully from the slide and cover glass with the help of a blade without disturbing the slide.
2. The slide is kept in a Petridis containing 45% acetic acid for separation of the cover glass and slide from each other.
3. They are then transfer to a mixture of acetic acid and Butanol (1:1) for 1 minute. Then they are transfer to an absolute Butanol for 30 seconds and then the slide and cover glass is mounted in eupatrid separately

Meiosis is the process of nuclear division which occurs during the final stage of gamete formation. Meiosis is consist of two cell divisions

- A. Meiosis I (Reduction phase)
- B. Meiosis II (Equational Phase)

STAGES OF MEIOSIS:

Meiosis I

- This is sometimes referred to as the reduction division because it is during the first meiotic division that the chromosome number is reduced from 46 to 23.
- Meiosis I consist of four stages: prophase I, metaphase I, anaphase I, and telophase

Meiosis I: Prophase I

Prophase stage of meiosis I is relatively long and can be subdivided into five stages.

- Leptotene
- Zygotene
- Pachytene
- Diplotene
- Diakinesis

Fig.: Different stages of meiosis cell division

