Aim

To prepare a temporary mount of a leaf peel in order to show the stomata of a leaf

Principle/Theory

Plants are the primary producers. They carry out physiological processes such as photosynthesis and respiration which requires a gas exchange between the tissues of plants and the atmosphere. This process is carried out through tiny openings located in leaves, known as stomata.

the structure of stomata.

Stomata are small elliptical openings on leaves that contain chloroplasts. They are girdled by two-kidney shaped cells known as guard cells on either side of the stomata. The guard cells possess a thick inner wall and a thin outer covering which control the closing and opening of the pores of stomata.

the closing and opening of the stomata.

Turgidity of the guard cells causes the stomata to open while the flaccid nature of the guard cells causes the stomata to close.

Material Required

- A potted plant of Bryophyllum or Tradescantia
- Needles
- Forceps
- Watch glass
- Dropper
- Glass slides
- A brush
- Coverslips
- Blotting paper
- Safranin
- Compound microscope
- Glycerine

Procedure

- Picked a healthy leaf from the potted plant
- Folded the leaf to gently pull the peel apart to separate a peeled section from the lower surface of the leaf.
- Used the forceps to perform this step. Allow the peel to remain in a watch glass holding water for some time.
- In the watch glass, stained the sample by adding some drops of safranine through a dropper.
- Taken the peel out after 2-3 minutes. Set it on a clear glass slide

- Added a drop of glycerine on the peel. Put a clear coverslip over it gently using a needle.
- Excess glycerine and stain can be removed using blotting paper
- Examined the slide first under a low-power and then under a high-power magnification of a compound microscope.

Observation

- Visible epidermal cells. The cells in their outline are irregular with no intercellular spaces
- Small openings, stomata are scattered through the epidermal cells
- Guard cells are observed which have chloroplasts and nucleus
- Guard cells are observed having a thin outer covering and a thick inner boundary(concave)
- Guard cells control the closing and opening of the stomata.

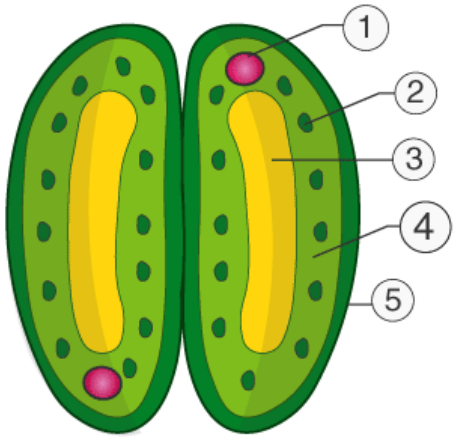
Conclusions

Epidermal cells are found containing stomata on the lower surfaces of the leaf.

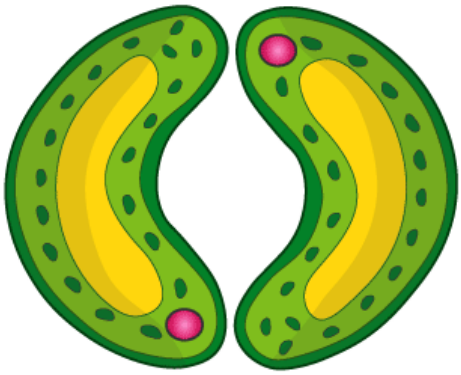
Precautions

- Avoid folding the leaf too much. The peel should be snipped to a proper size
- The peel should always be placed at the centre of the slide and the slides should be held from the sides.
- The peel should neither be overstrained nor under strained
- A brush should be used to handle the peel, otherwise would damage cells.
- Glycerin should be used in order to prevent drying of the peel
- Coverslip needs to be placed in such a way that air bubbles are avoided
- Blotting paper can be used to remove excess stain

OPENING AND CLOSING OF STOMATA



(a) Stoma Closed



(b) Stoma Open

1 Nucleus | 2 Chloroplasts | 3 Vacuole | 4 Guard Cell | 5 Cell Wall

https://youtu.be/NyIWaTz08Zw

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