

2. Discuss the various modern views about the stomatal movement?

Ans: Leaf surface bear minute pores called stomates. They form the site for transpiration and gaseous exchanges. These pores are specific in structure and function. They act as valves, opening at daytime and closing during night. The opening and closing of stomates has been named as stomatal movement.

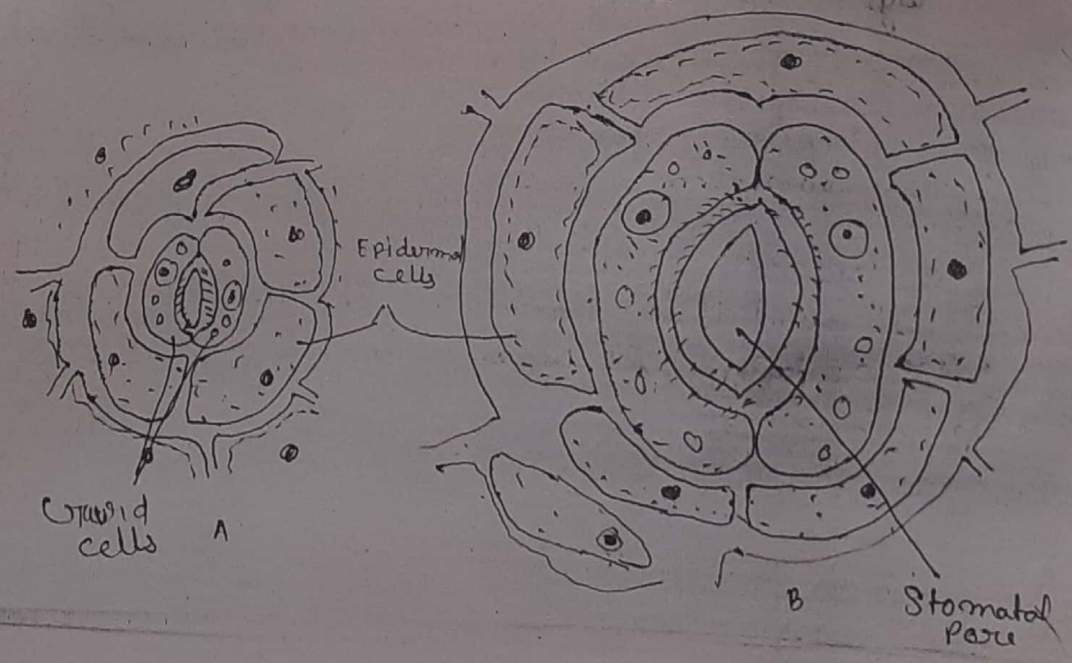
Definition: Stomates are minute pores of valvular nature occurring on leaf surfaces through which transpiration and gaseous exchange takes place.

Structure of stomata: Stomates are minute structures with 3 parts.

- ① Guard cells
- ② Stomatal pores
- ③ Subsidiary cells.

① Guard cells: Stoma has two kidney shaped or dumbbell shaped guard cells. They are living having a large nucleus and dense cytoplasm. Their inner walls are more thicker than the outer ones. They have transverse bunch of contractile fibrils.

② Stomatal Pores: The concave faces of guard cells face each other to form stomatal pore.



③ Subsidiary cells: They are modified epidermal cells that covered the guard cells. They are two in numbers but stoma of some plants like sedum lack subsidiary cells.

### Stomatal movement:-

Generally the stoma open during the daytime when the guard cells are fully turgid. They close when the guard cells get flacid but the factors that controlling turgidity and flacidity of guard cells have not been clearly understood. There are following modern views about stomatal movement.

① Starch-Sugar hypothesis:- It was given by L Lloyd -1919. but was supported by workers like Turg -1948, Steward and others. The view is based on the following facts

- a) Guard cells contain more sugar
- b) pH of guard cells is higher during daytime.
- c) Guard cells contain starch during night
- d) pH of guard cell is low during night
- e) Guard cells contain starch phosphorylase that catalyzed starch/sugar inter conversion.

When there is more sugar, osmotic pressure of guard cell increases. It starts taking water from the subsidiary and epidermal cells. They become turgid to open the stoma. The reverse reaction happens when the op of guard cells gets lowered.

Steward, 1964 has supported these view but with certain modification. He was given following scheme:-