Quadrant II – Transcript and Related Materials

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Module Name: Stomatal types

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STOMATA: The stoma together with subsidiary cells are termed as **stomatal apparatus or stomatal complex.**

OCCURANCE

- Occur on All Aerial Parts of the Primary Plant Body but abundant on leaves.
- May be raised above or sunken below the surface of the epidermis.

Structure of stomata

- The stomata consists of minute pores called stoma surrounded by a pair of guard cells.
- Stomata open and close according to the turgidity of guard cells.
- The cell wall surrounding the pore is tough and flexible.
- The guard cells are bean shaped and contain chloroplast.
- Guard cells are in turn surrounded by subsidiary cells
- These cells are accessory cells to guard cells and are found in the epidermis

Types of Stomata

1. Based on Location

- Epistomatic: In this type, stomata are found only in the upper leaf surface. Example: Nymphaea, Marsilea
- Hypostomatous: : In this type, stomata found in large number on the lower surface of the leaf. Example: Ficus, Nerium
- Amphistomatous: In this type, stomata found equally in both the lower and upper surface of the leaf. Example. Grass, rice

2. Based on Development

- Mesogynous: It is a type of stomatal development, where the guard cells and the accessory cells develop from the identical or similar mother cell. Example: Members of the Brassicaceae family.
- Perigynous: It is another type of stomatal development, where both the guard cells and the accessory cells develop from the non identical or different mother cell. A guard cell develops from a mother cell, and the accessory cells develop from the neighbouring cells. Example: Members of Cucurbitiaceae family.
- Mesoperigynous: It is a type of stomatal development, which correlates with both misogynous and Perigynous type. In mesoperigynous, the guard cells and one accessory cell develop from the single mother cell while the other accessory cells may develop independently from the neighbouring cell. Example: Members of the Brassicaceae family.

3. Based on the Structure: in dicots

i. **Anomocytic:** epidermal cells around the guard cells are not distinguishable from other epidermal cells, that is, subsidiary cells are lacking.

   Example: Ranunculaceae, Malvaceae

ii. **A*nisocytic:*** stoma is surrounded by three subsidiary cells, with one distinctly smaller than the other two.

   Example: Arabidopsis and Brassicaceae

iii. **Paracytic:** stoma is accompanied on either side by one or more subsidiary cells parallel to the long axis of the guard cells.

   Example: Cruciferacea, Solanum, Nicotiana.

iv. **Diacytic:** stoma is enclosed by a pair of subsidiary cells whose common walls are at right angles to the guard cells.

   Example: Acanthacea, Caryophyllaceae

v. **Actinocytic:** stoma is surrounded by a circle of radiating cells whose long axes are perpendicular to the outline of the guard cells

   Example: Araceae, Musaceae, Commelinaceae

vi. **Cyclocytic (encyclocytic):** stoma is surrounded by one or two narrow rings of subsidiary cells, numbering four or more.
Example: Monocots: Palmae, Pandanus, Cyclanthaceae Dicots: Lumnitzera, Laguncularia

Monocots

i. **Tetracytic:** stoma is enclosed by four subsidiary cells, two lateral and two polar (terminal), Found in dicots as well such as Tilia, some members of Asclepiadaceae.

ii. **Graminaceous type:**The stomatal guard cells are dumb bell shaped. They are surrounded by subsidiary cells which are lying parallel to the long axis of the pore.
Example: In the members of Poaceae and cyperaceae