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Ontogeny and Phyllotaxy of Leaves

Facilitator :Dr. Sagarika Parida

Dept. of Botany,

School of Applied Sciences

Centurion University of Technology and Management

Bhubaneswar



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Origin and Development of Leaf

- A leaf primordium is differentiated from a little below the SAM (Shoot Apical Meristem)
- Elongates and forms a cone-shaped structure around the SAM
- At the top of this structure, the mid-rib starts to differentiate.
- Soon after, smaller veins start to form on both sides of its base
- These are the early stages of leaf blade formation
- When the primordium has grown to about 8 mm, a cavity develops at its base

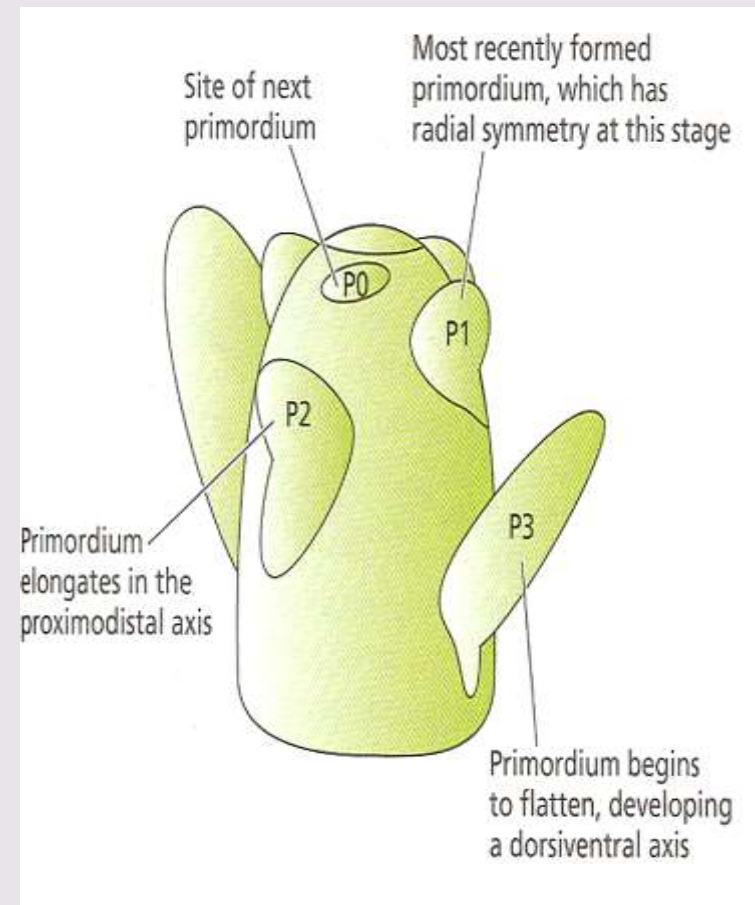


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Contd....

- The auricles and the ligule differentiated into collar
- The collar separates the blade and the sheath Blade has grown to its full size and ready to emerge
- Unrolls from its tip down to the base and expand
- Leaf sheath starts to elongate



Leaf Development



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Phyllotaxy Types

The arrangement of leaves on the stem (Fig. 68) is called phyllotaxy.

1. Alternate:

Only one leaf develops at each node

Ex: *Brassica campestris*, *Nicotiana tabacum*.

It is of four types

(a) Distichous or 1/2 or 2- ranked:

3rd leaf comes over the first one

Ex: grasses.

(b) Tristichous or 1/3 or 3-ranked:

4th leaf comes over the first one

Ex: *Cyperus*



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(c) Pentastichous or 2/5 or 5-ranked:

6th leaf comes over the first one after completing two revolutions of the spiral

Ex: apple.

(d) Octostichous or 3/8 or 8-ranked:

9th leaf comes over the first one after completing three revolutions of the spiral

Ex: *Carica papaya*

2. Opposite:

A pair of leaves are present just opposite to each other at each node

Ex: *Calotropis*



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Types:

(a) Opposite and decussate:

Two successive pairs of leaves occur at right angle to each other

Ex: *Psidium*.

(b) Opposite and superposed:

All the pairs of leaves occur in the same plane

Ex: *Combretum*.

3. Whorled:

More than two leaves are arranged in the form of a whorl at each node

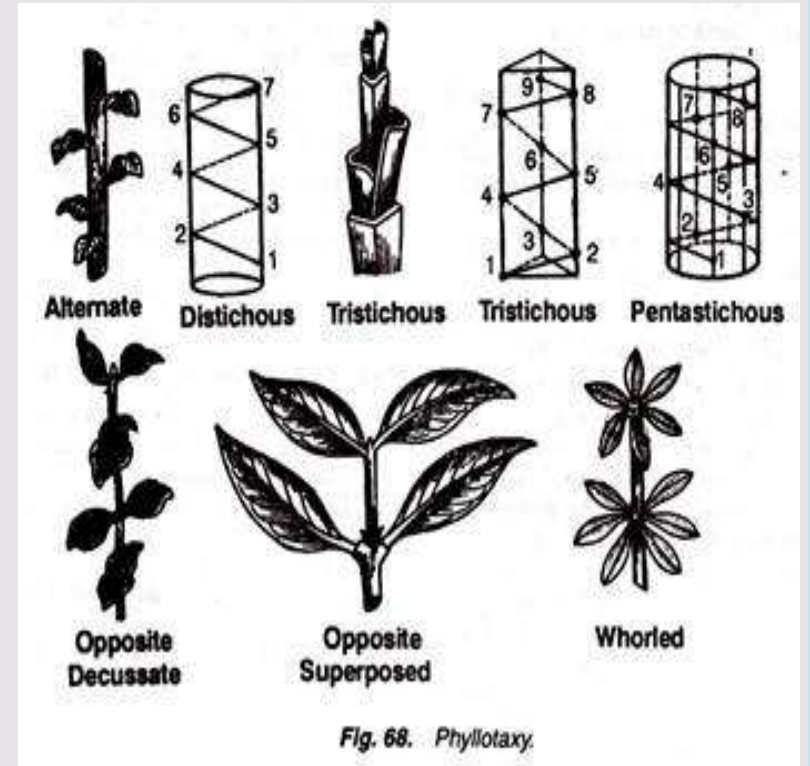
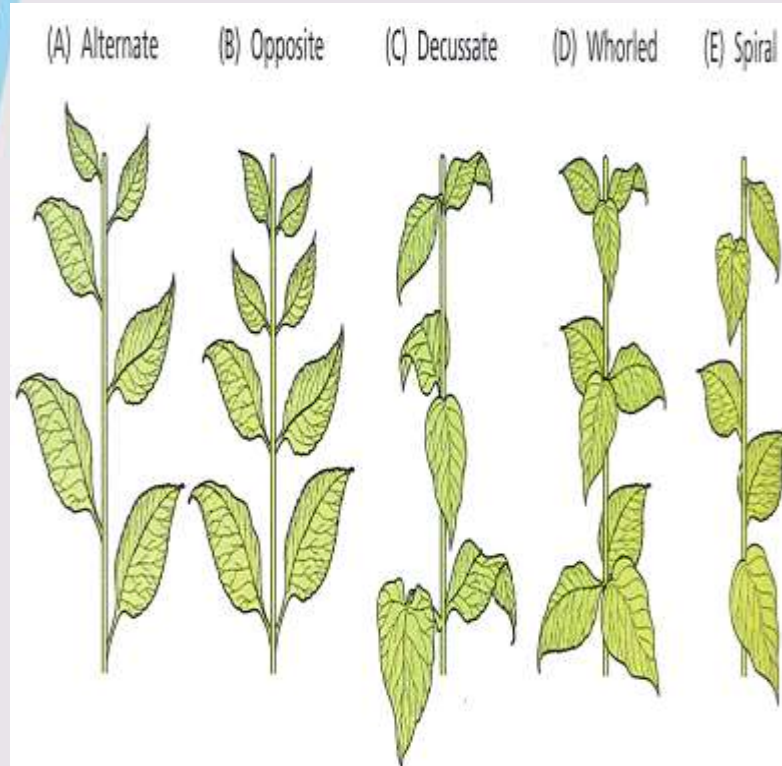
Ex: *Hydrilla verticillata*, *Nerium*, etc.



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Leaf Arrangement





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Thank You