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# **Ontogeny and Phyllotaxy of Leaves**

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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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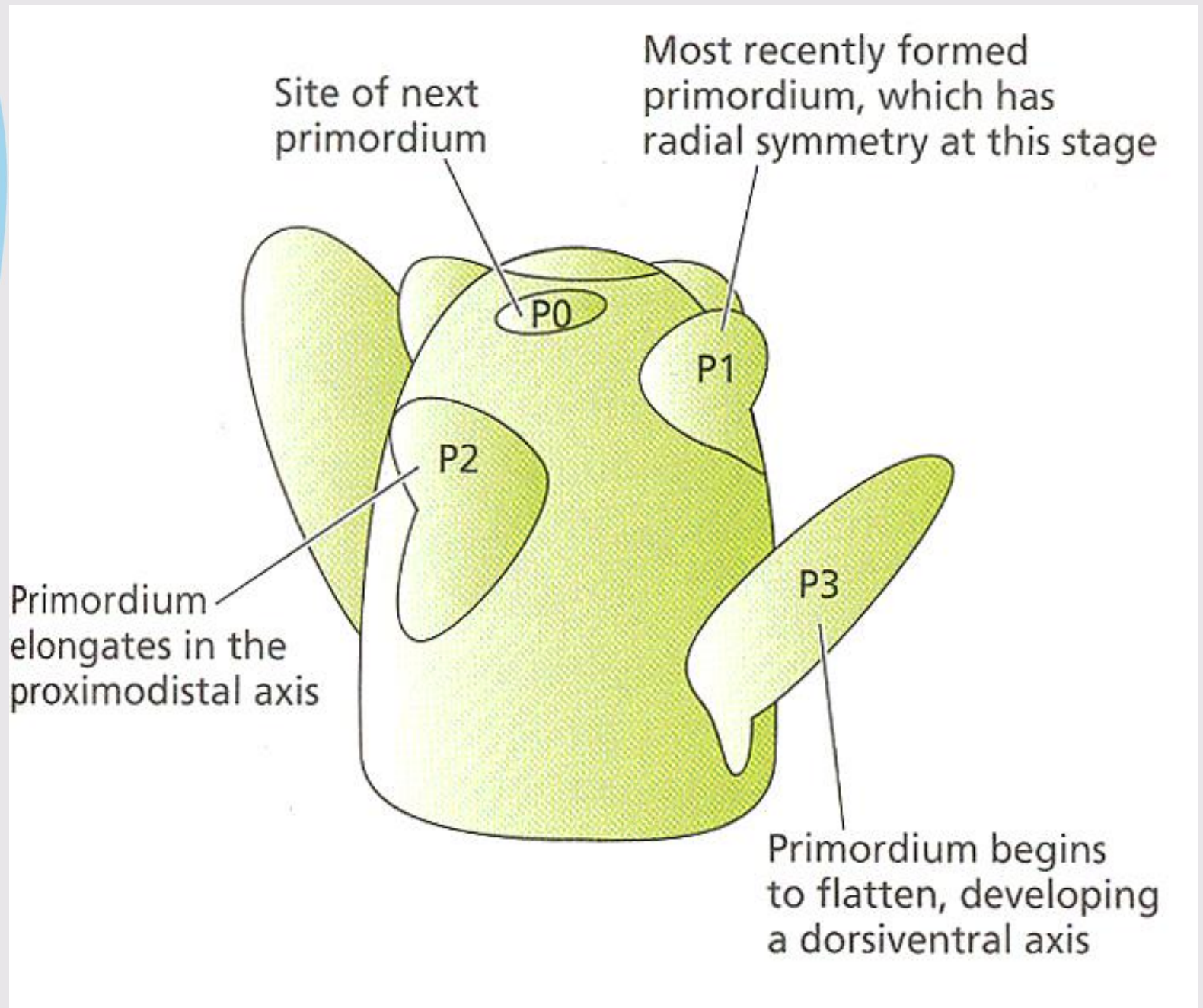
**Contd....**

- 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.



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## 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:

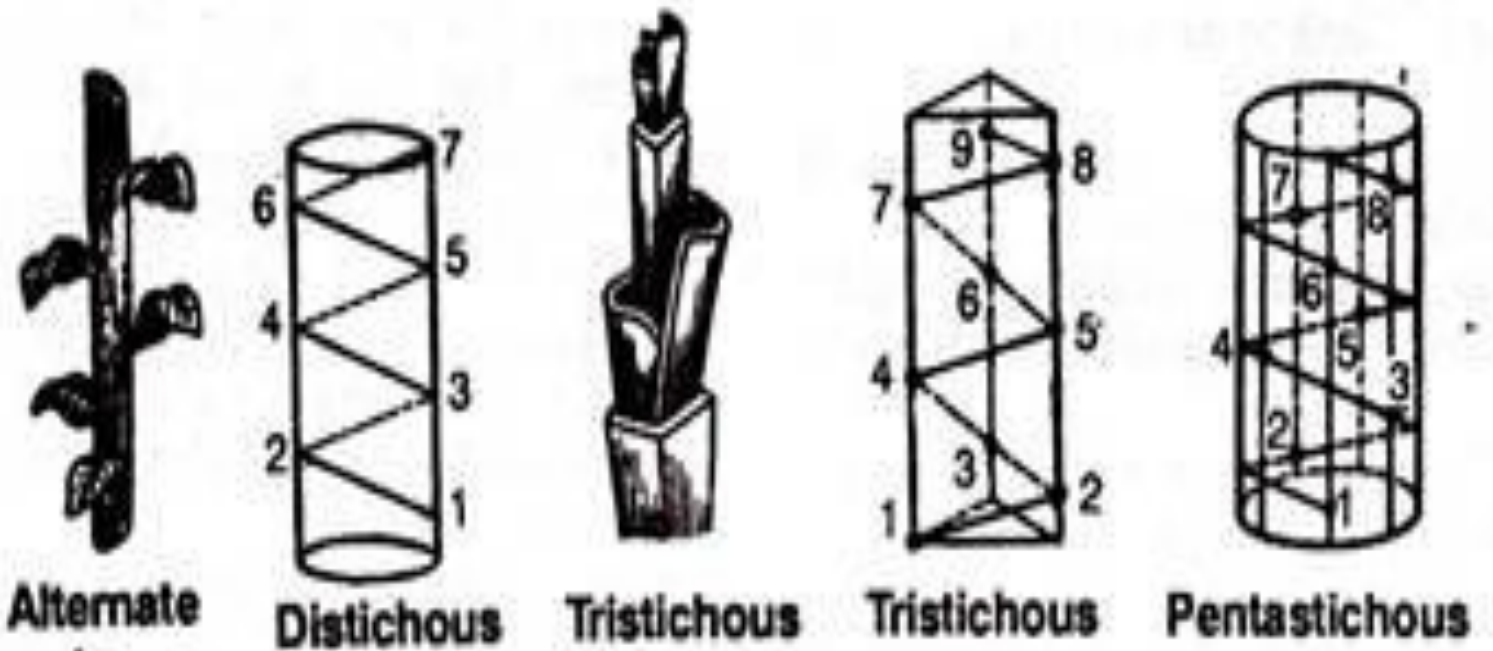
More than two leaves are arranged in the form of a whorl at each node

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



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**Fig. 68. Phyllotaxy.**



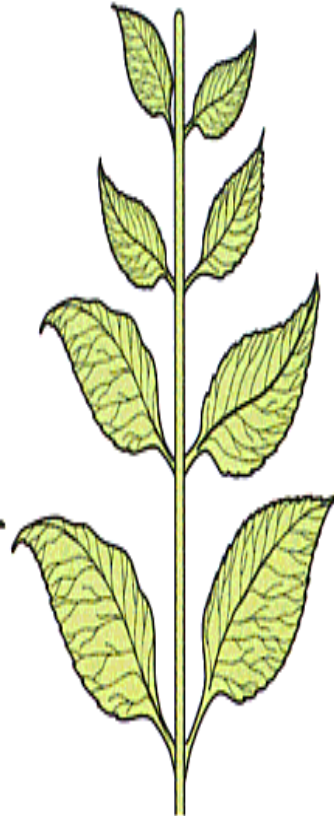
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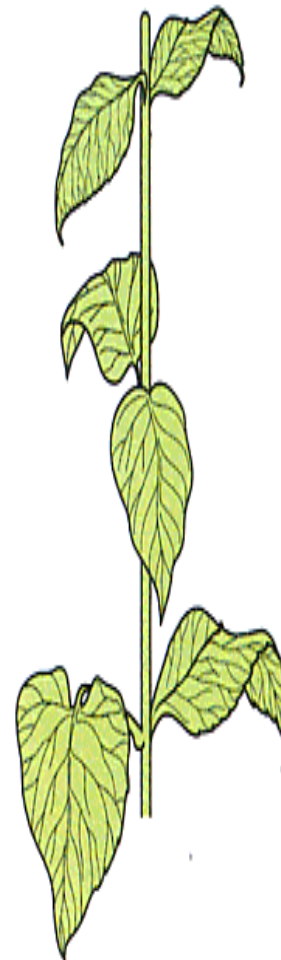
(A) Alternate



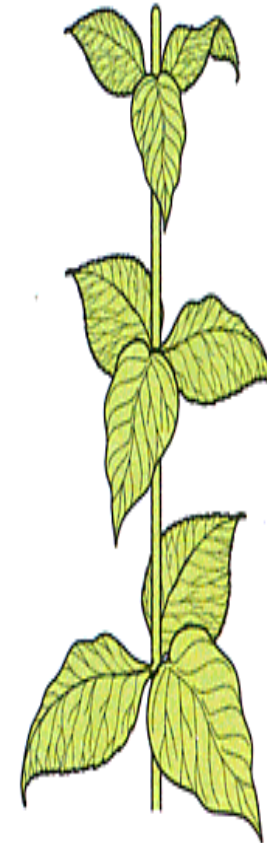
(B) Opposite



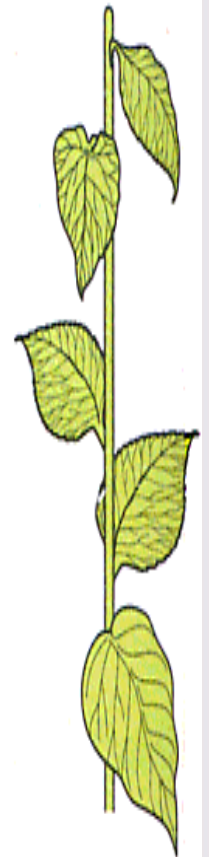
(C) Decussate



(D) Whorled



(E) Spiral



## Leaf Arrangement



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***Thank You***