

# **Topic: Pinus; Reproductive Structure**

**B.Sc. Botany Hons. II**

**Paper: III Group: A**

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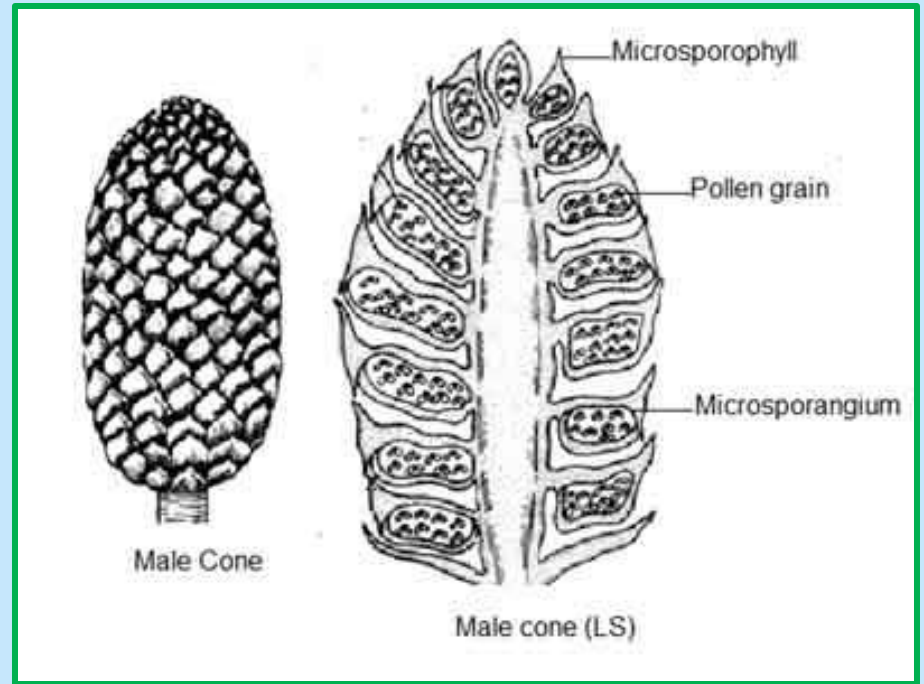
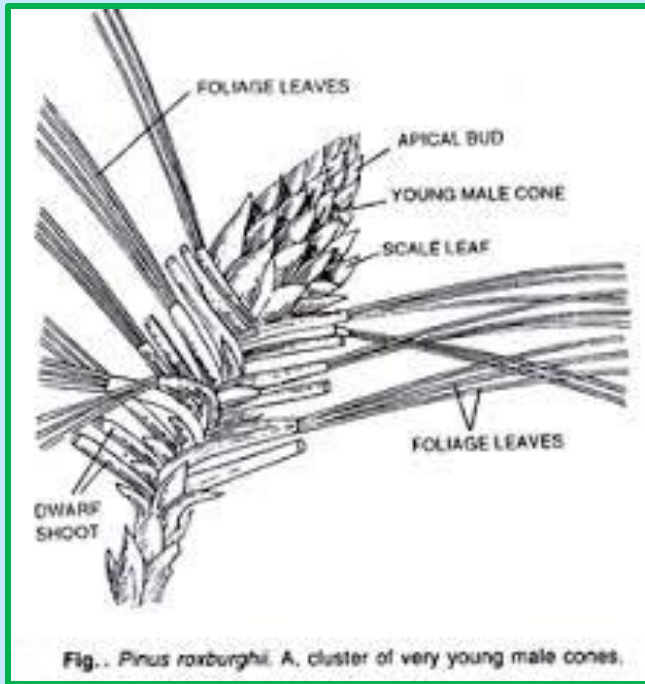
## **Reproductive Structures of Pinus**

The Pinus is monoecious plant which shows the sporophytic generation. The microsporophyll (male) and megasporophyll (female) are formed on the same plant but these two types of sporophylls appear usually in separate cones or strobilli.

The male and female cones are known as staminate strobilus and carpellate strobilus, respectively. The Pinus does not show vegetative reproduction. The flowers are unisexual. They always occur on the shoots of the current and a little away from the apex.

### **Male cone (staminate strobilus)**

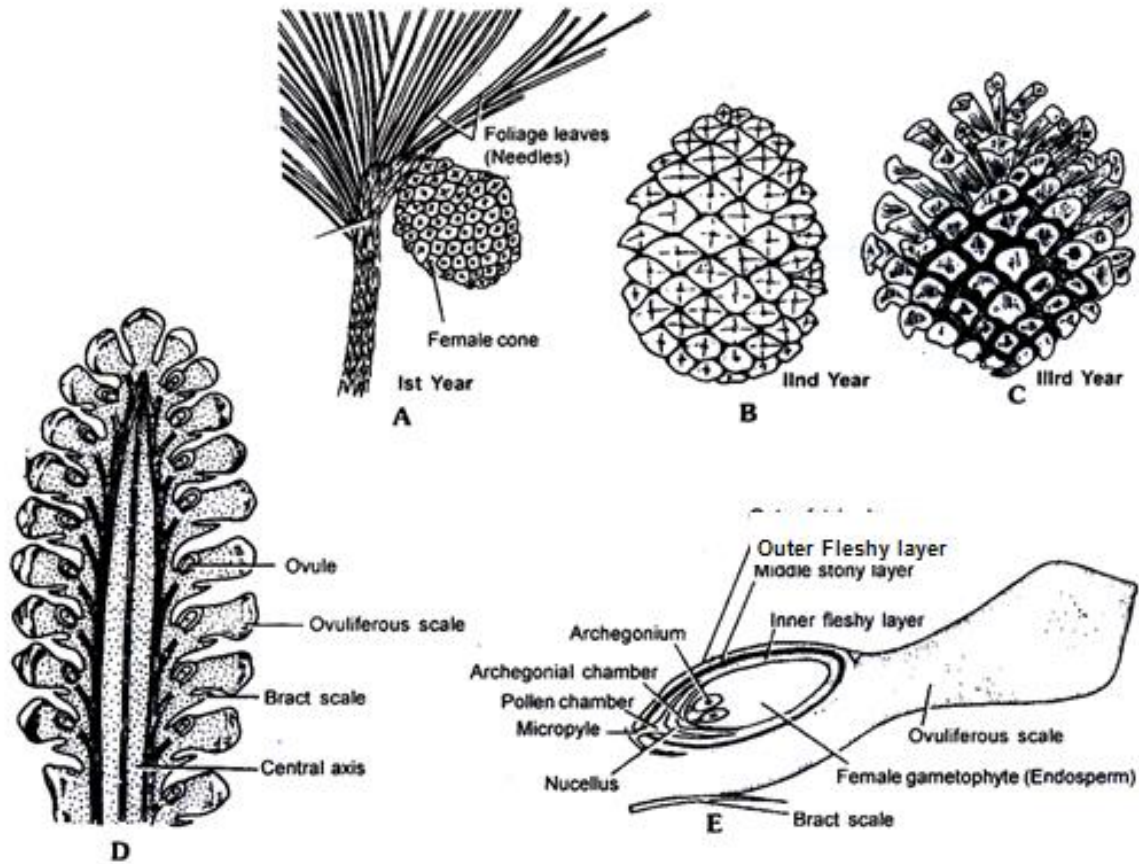
- The male cones are simple, compact, oval structures and about 2-3 cm long. They are found to occur in clusters, near the tip of the long shoots.
- Each male cone bears a short and elongated central axis upon which a large number of microsporophylls or stamens are arranged spirally. The microsporophylls are scaly and their number varies from 60 to 135 in each cone.



- A microsporophyll consists of a short filament or stalk and a terminal leaf-like expanded structure while the apex is slightly bent upwards.
- Each microsporophyll bears two pouch-like microsporangia (anthers or pollen sacs) on its ventral surface.
- A microsporangium is sessile and oblong which is supported with a jacket of several layers of cells.
- Each microsporangium produces a several microspores (pollen grains).
- The wall of each microspore is covered by inner intine and an outer exine.
- The microspores are winged and yellow in color. In this case, wings help in the dispersal of spores by wind.

### **Female Cone (ovulate strobilus)**

- The female cones are larger and compound in nature.
- They are formed in clusters of 1-4 in the axils of scale leaves of long shoots.



**Pinus : A-C. Female cone First, Second and Third year D. L. S. of Female cone**

**E. Structure of Megasporophyll and female gametophyte.**

- Initially, they are green but ultimately become brownish red in color.
- It starts to produce in winter and become ready for pollination during the spring. It is hard woody and dry structure.
- It bears a central axis upon which a large number of megasporophylls are arranged spirally.
- Each megasporophyll has short stalk with a large ovuliferous scale on the upper surface and a small bract scale on the lower surface.
- Each ovuliferous scale bears two inverted megasporangia on its upper surface towards the base.
- Each megasporangium consists of a massive tissue which is called the nucellus and an envelope which is known as the integument.
- At the basal region, the integument is fused with the nucellus and open at the top by forming micropyle.

- A single megaspore mother cell is differentiated within the nucellar tissue, which divides meiotically to form four megaspores.
- Of these four megaspores, only the lower most one is functional while others degenerate.
- The only functional megaspore increases in size and takes part in the development of the female gametophyte.