

# STRUCTURAL ORGANIZATION OF MALE & FEMALE STROBILI (CONES) OF PINUS

Dr. M. Roy

PAPER-III  
Group-A

TDC Part-II(H)  
(2019-20)

Pinus is monoecious, and bears both microsporophylls in staminate strobili, and megasporophylls in carpellate strobili. However, bisporangiate strobili may occur in exceptional cases, as in P. maritima and P. laricio.

## Staminate (Male) Strobilus:

- (i) Found in clusters towards the apex of some branches
- (ii) It consists of a short axis bearing microsporophylls arranged spirally.
- (iii) Each microsporophyll consists of a stalk subtending an extended scale-like portion.
- (iv) On the undersurface of the scale, and to the side of the stalk, there are two microsporangia (= pollen sacs).
  - (v) Microsporangial wall consists of several layers, and the inner layer, at least, forms the tapetum, surrounding the spore mother cells.
  - (vi) Four microspores (= pollen grains) are produced from each microspore mother cell.
  - (vii) Microspores usually shed within a few weeks after the appearance of the strobili.
  - (viii) Each microspore consists of an oval cell with a conspicuously large nucleus, and has two balloon-like air-filled wings.

## Carpellate (Female) Strobilus:

- (i) Carpellate strobili are formed near the tips of certain branches.  
- They are about 1 cm. in length and deep red in colour.

.... Contd. p. 2

: 2 :

(ii) Each strobilus is a compound structure and consists of a central axis, on which megasporophylls are spirally arranged.

(iii) A megasporophyll consists of a very short stalk and an ovuliferous scale to which a bract is attached on the lower side.

- At the base of the ovuliferous scale, and on its upper side, there are two rounded megasporangia or ovules.

(iv) Each ovule consists of an oval nucellus, surrounded by a single integument, and its micropyle is directed towards the stalk of the megasporophyll (Carpel).

- At the chalazal end, tissues of the integument and nucellus are fused with that of the ovuliferous scale.

- There is a single central megaspore mother cell within the nucellus.

- Nucleus of the MMC undergoes reduction division (meiosis) to form a linear tetrad of megaspores.

- The megaspore farthest from the micropyle remains functional and enlarges considerably while the other three are consumed in nourishing the functional megaspore.

Figs.  
↓





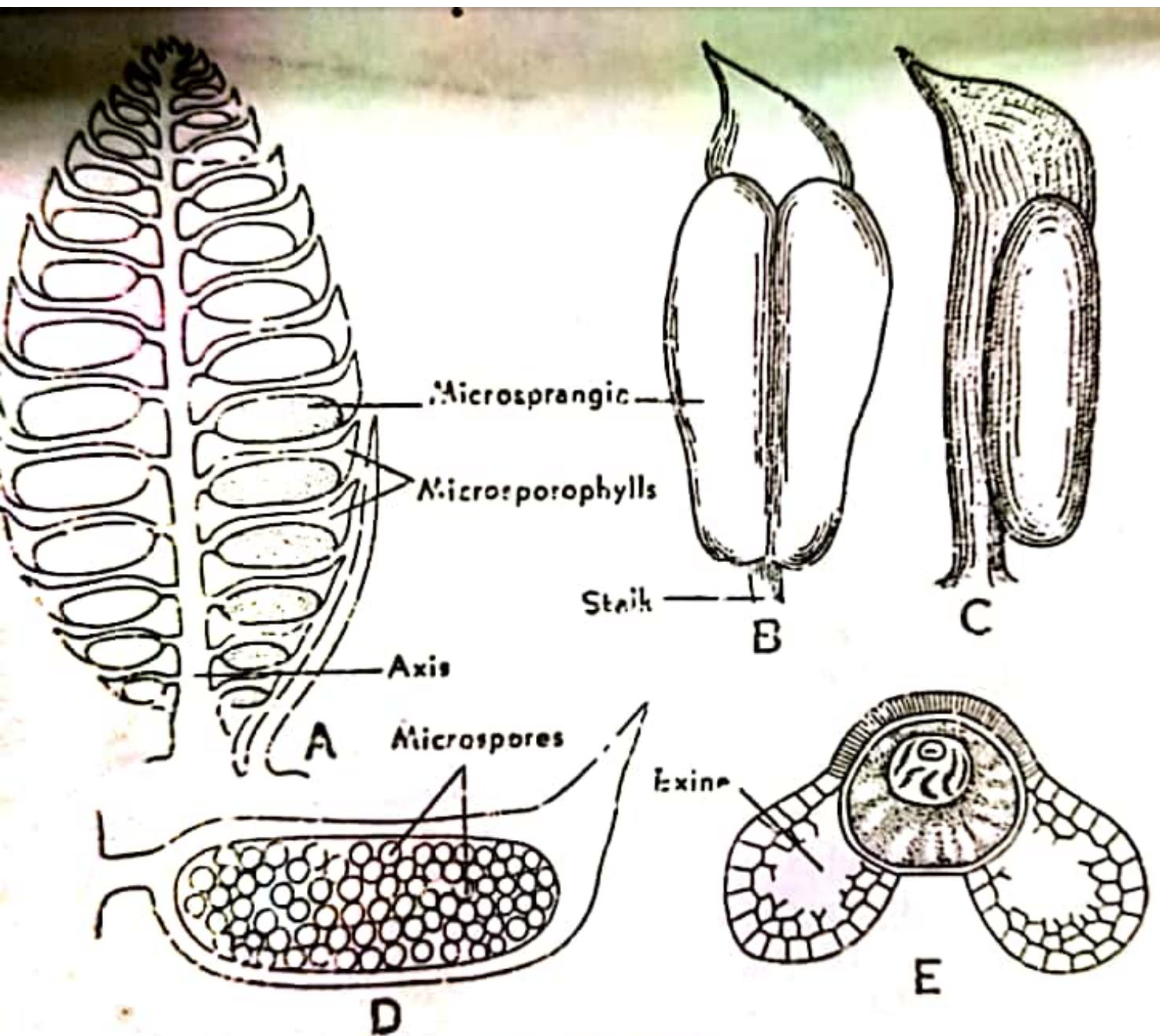


Fig. 459. *Pinus*.

A, A staminate strobilus in l.s.; B-C, Microsporophyll with microsporangia in front and side views respectively; D, A single microsporophyll with microsporangium and microspores in l.s.; E, mature microspore.



Fig. 461. *Pinus*.

A, A carpellate strobilus at the time of fertilization; B, The same months later with scales spread apart and seeds shed.