

SPOROPHYTE OF TAXUS

Dr. M. Roy

PAPER-III
Group-A

TDC Part-II(H)

Systematic Position

Division - Coniferophyta

Class - Taxopsida

Order - Taxales

Family - Taxaceae

Genus - Taxus

Species & Distribution:

Taxus is represented by a single species, (Pant, 1957)
T. baccata; some authors recognize a number of species, viz., T. cuspidata, T. brevifolia, T. contorta, T. recurvata, etc.

It is a slow growing tree with a usual height of 30-40 ft. The plant is extensively distributed over U.K., Germany, USA, Mexico, Japan, Iran, Philippines, and India (in the Western Himalayas).

External Morphology:

- (i) An evergreen tree with a massive trunk and profusely growing branches ^{of unlimited growth} form a thick canopy.
- (ii) Leaves are simple, linear, slightly stalked and twisted at the bases, giving rise to a two-ranked arrangement. They have sharp pointed tips.

Anatomy: (i) Stem anatomy shows a general arrangement of the Pinus type, with some differences.

(ii) However, resin canals are completely absent; - Tracheids of the secondary wood possess spiral thickenings in addition to the usual uniseriate bordered pits.

- Medullary rays are also uniseriate, and wood parenchyma are absent.

(iii) Root is diarch, and is also devoid of resin canals; tracheids possess

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Spiral thickenings.

(iv) Leaf anatomy broadly resembles that of a Cycas leaflet in some respects.

- There are two cuticularized epidermal layers, the upper one being continuous, while the lower one is interrupted at intervals by sunken stomata.

- Mesophyll differentiated into upper palisade and lower spongy parenchyma.

- Occasionally ^{some} spongy parenchyma cells may contain some resinous yellow-coloured material.

- A solitary vascular bundle lies at the centre delimited by an endodermis with xylem towards the upper surface and phloem towards the lower one.

- Pericycle is modified into transfusion tissue.

Reproductive Structures:

Taxus is dioecious with male flowers borne in strobili while female strobili are so highly reduced that they hardly appear as cones, and arise in the axils of leaves early in the season.

Staminate (Male) Strobilus:

(i) Staminate strobili are borne in the axils of leaves produced on the branches of the previous year.

(ii) Each strobilus consists of a short central axis, bearing about a dozen of spirally arranged scales, in basipetal order of development, at their bases, a cluster of closely inserted, umbellate microsporophylls at the top.

- Vegetative apex is also

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notably utilized in the production of sporophyll.

(iii) Each microsporophyll is a peltate, shield-like body with 6-8 pendant microsporangia, hanging from the undersurface of the shield.

(iv) Sporangia are united with each other as well as with the sporophyll stalk.

(v) Microsporangia contain numerous microspore mother cells, each of which gives rise to a tetrad of microspores (pollen grains) by reduction division.

(vi) Pollen grains are liberated by the dehiscence of the sporangium, and are dispersed by wind. They come in the neighbourhood of the ovule, and are caught by the pollination drop, exuded from the micropylar end of the ovule.

Megasporangium (Ovule):

(i) Ovules also occupy axillary positions on female plants.

(ii) The short central primary axis bears a number of closely imbricated, overlapping, sterile scale leaves in its basal region.

(iii) In the axil of the uppermost scale there arises a fertile shoot, the secondary axis, which bears three pairs of decussately arranged minute scale leaves, the lowermost pair of which stand at right angles to the subtending bracts. This secondary axis apparently terminates in a solitary ovule.

(iv) Vegetative apex of the primary shoot may occasionally proliferate, producing
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another secondary axis, bearing an ovule in the next year.

(v) Ovule is orthotropous and nucellus is free from the integument.

— Integument is three-layered as usual and forms a prominent micro-pylar canal above the nucellus.

— In some cases, the nucellus and the integument may be fused at the adult stage.

(vi) Just below the integument, there appears a slowly growing ring-like structure, which later on surrounds the entire ovule. This is usually known as the aril, but it is different from that of angiosperms.

— This aril can be compared with the epimatium of Podocarpus, while others consider it to be an outer integument.

— This structure is also referred to as the cupule by some authors.

(vii) With the maturity of the seed, it becomes red and gives to the seed a characteristic berry-like appearance.

Figs. below
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Fig. 470. *Taxus*.
A, A portion of the plant bearing male strobili; B, A male strobilus.

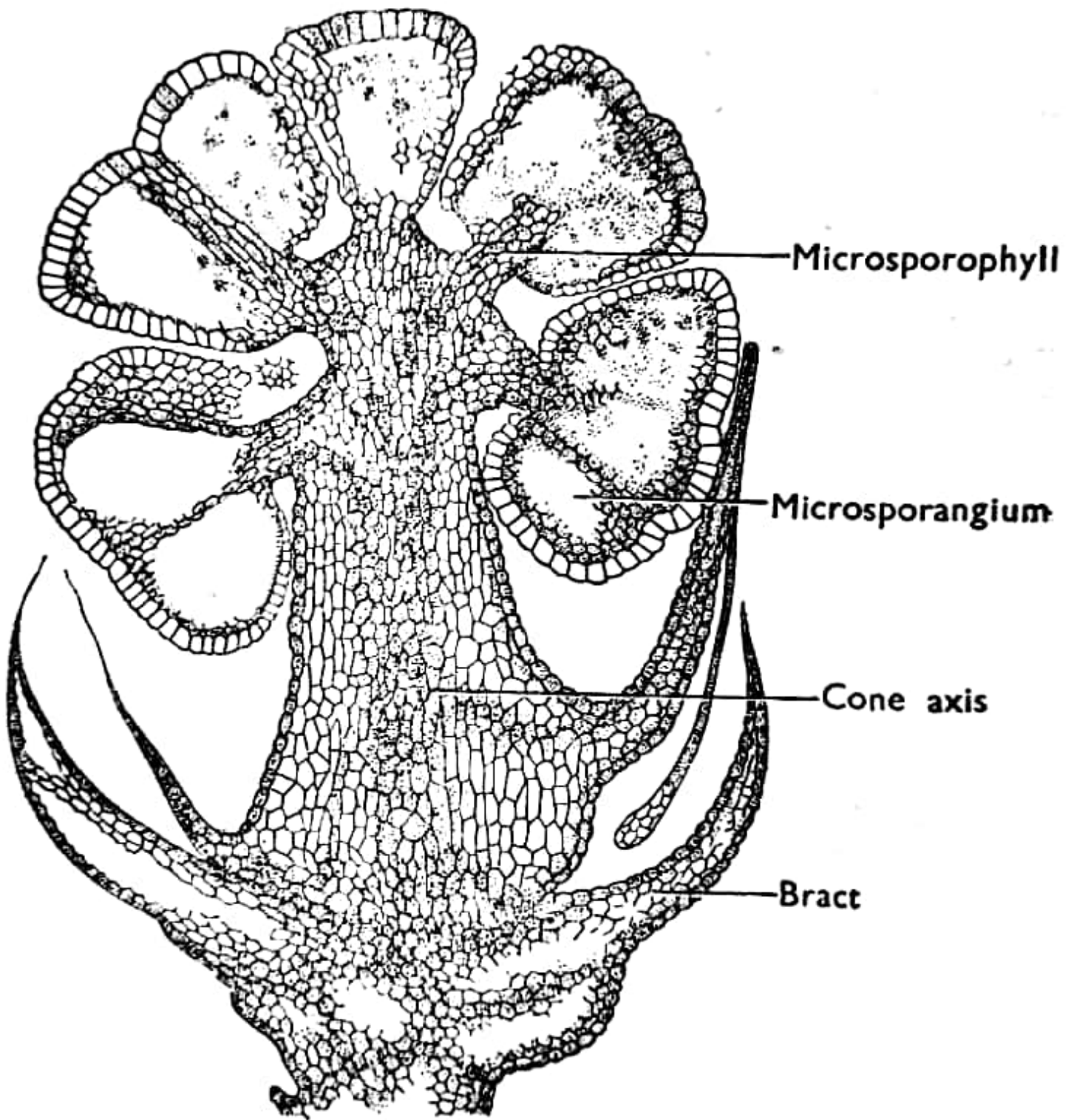


Fig. 471. *Taxus*.
L. S. of a male cone.



Fig. 472. *Taxus*.
A, A portion of the plant showing female
flowers; B, A female inflorescence.

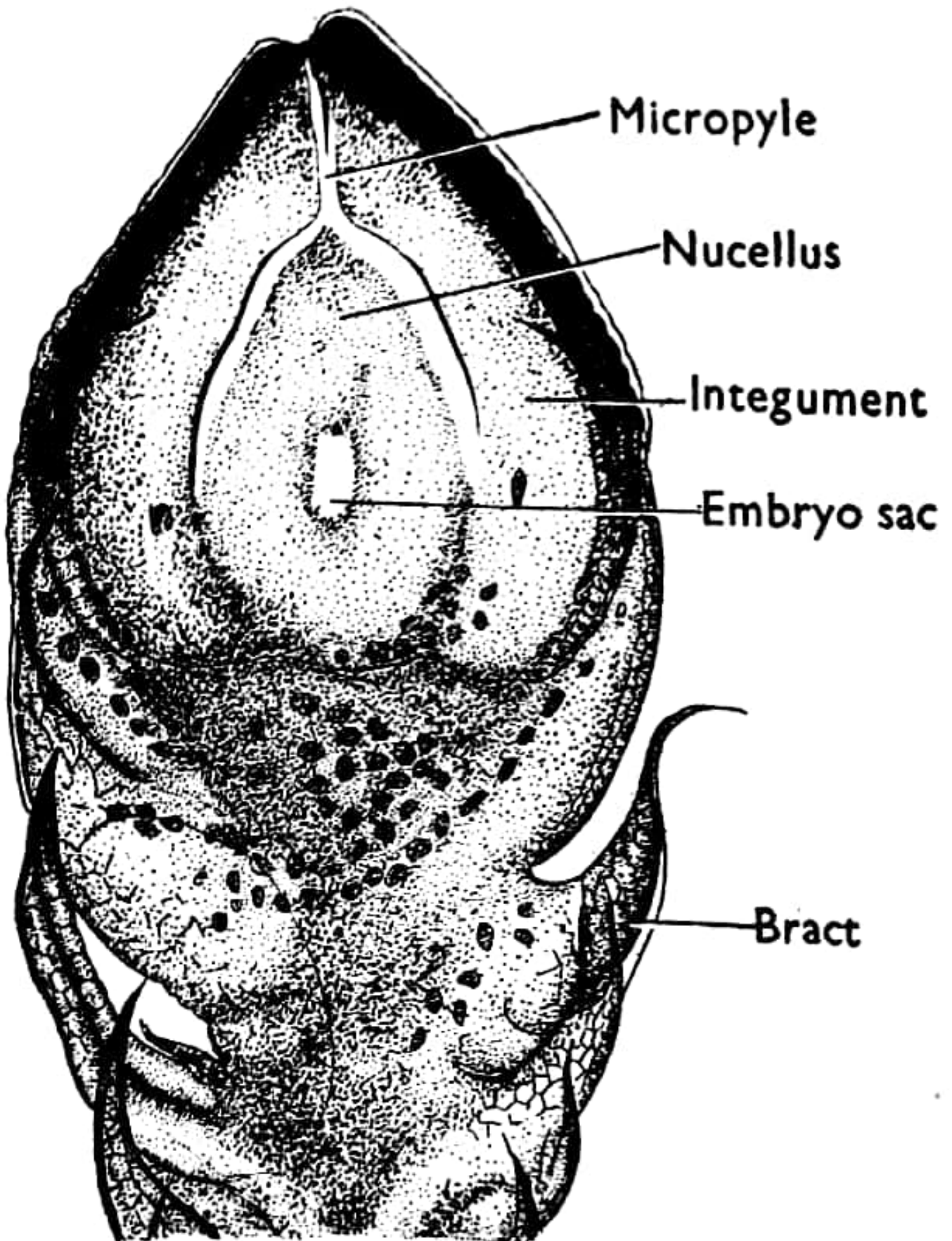


Fig. 473. *Taxus*.
L.S. through an ovule and
an ovuliferous branch.