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of fertile shoots. In early condition cone is sub-sessile and apiculate while the advanced type is stalked with a rounded apex.

The cone is composed of an axis which bears whorls of sporangiophores. Each sporangiophore is a stalked structure bearing a hexagonal peltate disc at its distal end. On the undersurface of the disc 5-10 elongate, cylindrical hanging sporangia. The axis bears a ring like outgrowth just below the whorl of sporangiophores. It is called as annulus.

• Mature sporangium: - The development of sporangia is of eusporangiate type, mature -

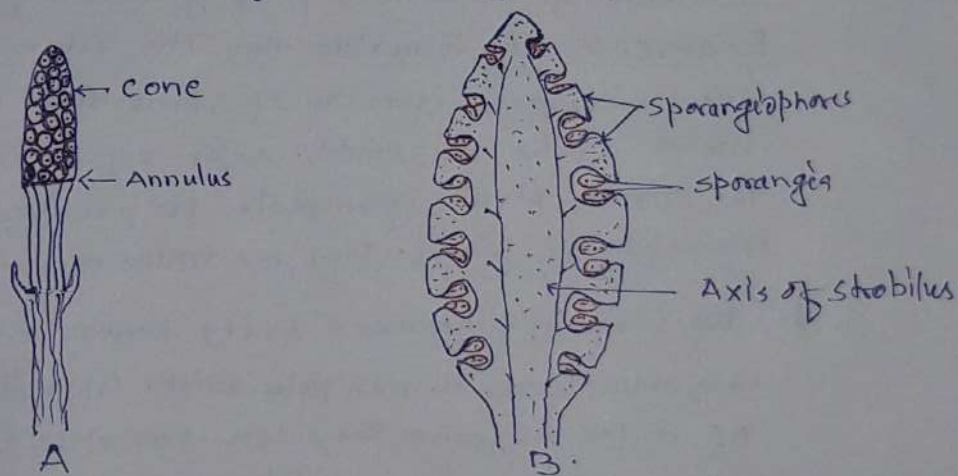


Fig. Equisetum spp. A - A part of fertile shoot bearing ~~strobilus~~ cone.
B. L.S. of strobilus / cone.

sporangium is an elongated and cylindrical structure. It consists of one cell jacket layer, inside which is a mass of sporogenous tissue. Some cells of the sporogenous tissue differentiate into

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b) Antheridia:- Antheridia generally begin to develop after the development of the archegonia. They generally develop on the photosynthetic lobes or besides the archegonia.

It is nearly rounded structure which consists one celled thick outer jacket layer and an inner androgenial cell. Primary androgenial cell divides and subdivides to form androcyte mother cells. Each andro. mother cell form two androcytes which finally metamorphosed into a large, spirally coiled and multiflagellate spermatozoid.

At maturity the jacket layer breaks and spermatozooids are released.

* Fertilization:-

Water is essential for fertilization. Antherozoids swim in water and move towards ^{the} archegonia. The NCC & VCC disintegrate so that a passage is formed for the entry of antherozoids. Many antherozoids pass through the canal but only one of them fuses with the egg. After fertilization zygote ($2n$) is formed which is the first cell of the sporophyte.

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long lived and branched structure. They grow on wet soil and shaded regions. Gametophyte is clearly differentiated into -

- a) Vertically erect, photosynthetic irregular shaped lobes, and
- b) a compact, cushion-like and colourless basal region

* Sex. organs :-

a) Archegonia - When the gametophytes are of 30-40 days old, archegonia appears in the meristematic region from where the upright lobes developed.

The mature archegonium has a neck and a Venter. The neck is short and consists of four vertical rows of cells and 1-2 neck canal cells.

The Venter remains embedded in the gametophyte and consists of a Venter canal cell and an egg.

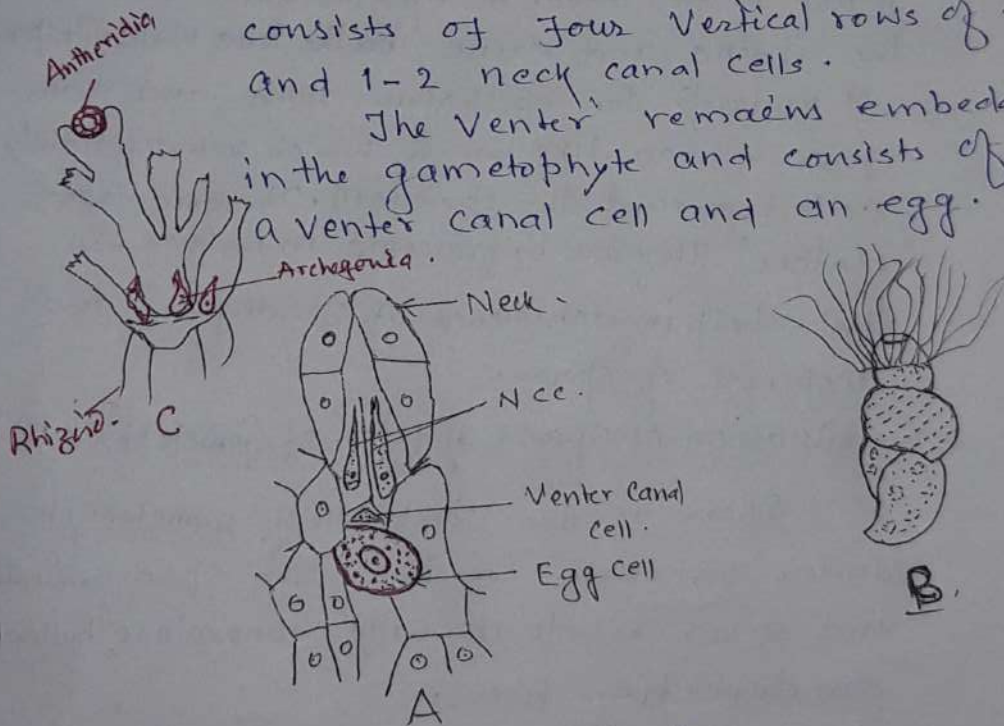


Fig. Equisetum ssp.

A - An archegonium (Mature)
B - Single spermatozoid.
C - Monoecious gametophyte.

Spore mother cells. These cells by meiotic ⁽¹¹⁾ division forms haploid spores tetrad. Equisetum is homosporous i.e. one type of spores are formed.

* Dehiscence of sporangium:- At maturity the cone axis elongates, as a result of which the sporangiophores become separated and exposed. Then sporangium splits open due to hygroscopic response of the cell wall.

* Spores:- The spores are spherical and filled with densely packed chloroplasts. The spore wall has four concentric layers. The innermost is the delicate intine, which is followed by thick exine. The 3rd layer is the middle cuticular layer while the outer most or 4th layer is episporium. However, the intine and exine are the true walls of the spore. At maturity the episporium splits and forms four ribbon like bands which remain tightly coiled around the spore wall. These are called "elaters". They are hygroscopic in nature so that help in dehiscence of sporangium and dispersal of spores.

* Germination of spores and dev. of Gametophyte:-

Spore is the first cell of gametophyte. Under favourable condition, the spore germinates and gives rise to normally monoecious, thallic gametophytic plant.

The mature gametophytes are green,

Name of the College: S.S. college, T'bad.

Date: 24.08.2020

Name of the Deptt: Botany

Time: 11:00-12:00

Subject: Pteridophyta

Name of the Teacher: Dr. S.S. Shar-

Topic: Equisetum

Class: B.Sc. Bot-H - PI

Medium of Teaching:

Biotechnology S - PI

EQUISETUM: REPRODUCTION

Sporophyte of Equisetum reproduces both by vegetative means and by spore formation.

1) Vegetative Reproduction: -

Vegetative reproduction takes place by :-

(a) Tubers - In some species tuber serves as a means of vegetative propagation e.g., E. arvense, E. telmateia etc. The tuber develops due to irregular growth of some buds at the nodes of the rhizomes. After separation from the parent plant, germinate to produce new sporophytic plants. They are round or ovoid in shape.

(b) By Branch Primordia: - Every branch of the rhizome bears branch primordia. After ^{the} decay of older rhizome they can develop into new sub-terranean and aerial branches.

(2) Reproduction by spore formation: -

In Equisetum, spores are formed ^{in sporangia} on a special structure known as 'cone' or Strobili (Sing. - Strobilus).

Cone arises singly at the apices