



Lecture No.:09

Date: 15th May, 2020

CORE CONCEPT OF  
Group A - Gymnosperms

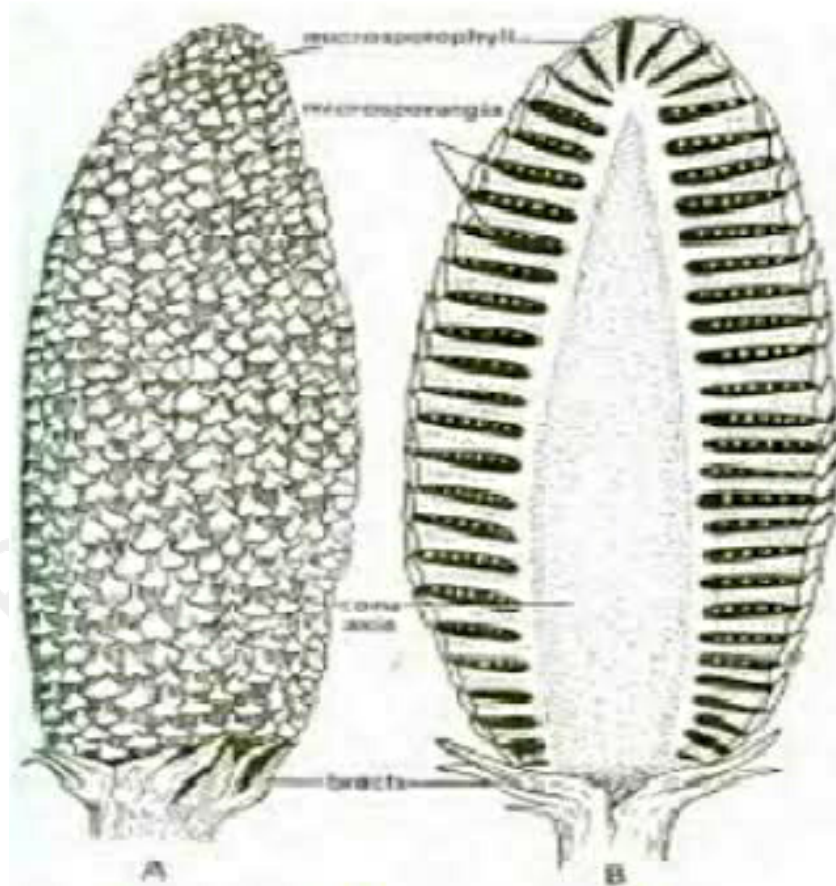
SUB./GEN. - PART 1

## CYCAS - II

**Reproduction -**  
Cycas is a **heterosporous** and **dioecious**.

The male cone is borne at the apex of the stem consisting of sporophylls arranged spirally around its axis.

Each microsporophyll on its under surface bears



**Fig. Microsporophyll**  
**A. Entire, cone B. longitudinal section**



pollen sacs or microsporangia grouped in sori. Each pollen sac produces numerous pollen grains (microspores) by reduction division in microspore mother cells. Cycas produces **no female cone**. The megasporophylls are borne loosely at the apex of the stem. Each megasporophyll has 1-5 pairs of ovules on two sides. Each ovule is **orthotropous** enclosed in an integument differentiated into three layers (middle stony, outer and inner fleshy). The tissue within the integument is called **nucellus**. There is a pollen chamber formed by the dissolution of nucellar beak. The megaspore mother cell within nucellus divides meiotically to form 4 megaspores, out of which only chalazal one is functional and rest 3 die out.

## Gametophyte -

**1. Male gametophyte** - The pollen grain develops to form male gametophyte. The mature male



gametophyte is a 5-celled structure. The nucleus of the pollen grain divides to form prothallial cell and antheridial cell. The antheridial cell divides to form generative cell and tube cell. The pollen grains are shed at this 3-celled stage.

## 2. Female gametophyte -

The functional megaspore enlarges and its nucleus multiplies rapidly by free nuclear division. A central vacuole appears pushing nuclei towards periphery. Wall formation starts

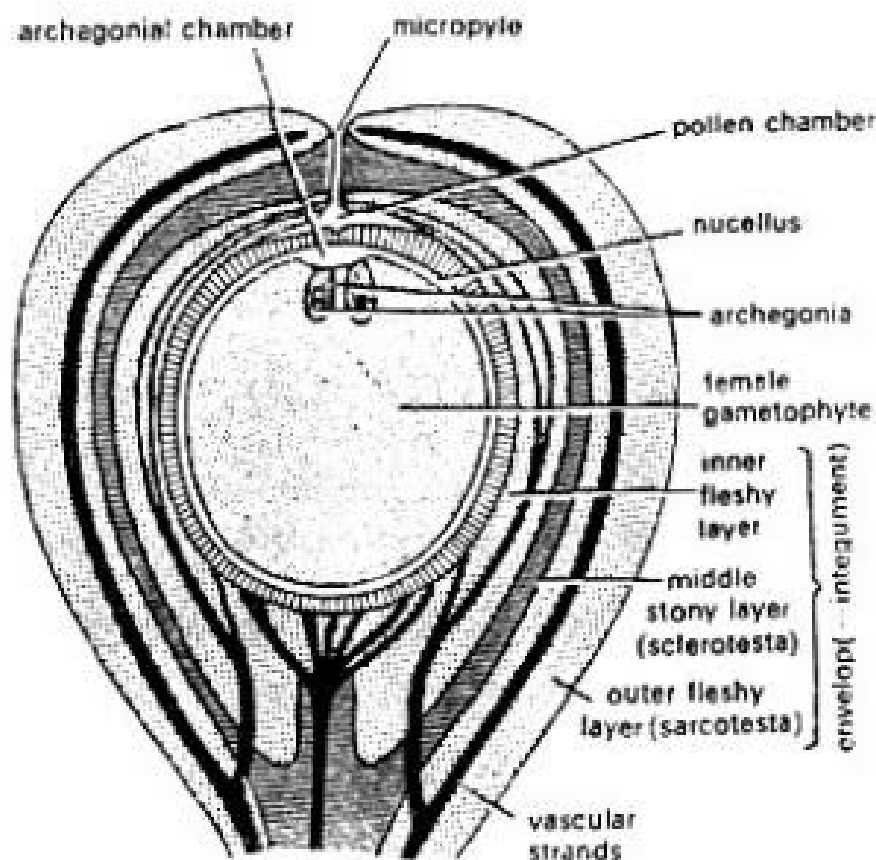


Fig. Structure of ovule LS



from periphery towards centre resulting in the obliteration of central vacuole. The female gametophyte is also known as **endosperm**. Two to eight archegonia are formed below archegonial chamber. The archegonium is extremely reduced consisting of a short neck (without neck canal cells) and a venter containing venter canal cell and an egg.

**Pollination and Fertilization** - Cycas is wind pollinated. The 3-celled pollen grains reach the pollen chamber of ovule and divide further. The tube cell divides to form a stalk cell and a body cell. The body cell divides to form two large topshaped, coiled and multicelate antherozoids. The pollen tube acts like a haustorium. The pollen tube bursts at the apex liberating antherozoids. Fertilization results in the formation of a zygote which develops into an embryo.

Polyembryony may sometimes be seen in cycas due to the fertilization of all the archegonia in the ovule, but only one embryo attains maturity. The ovule as a



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whole develops into the seed which has two **cotyledons**. Cycas does not show any resting stage before germination of seed.

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