HETEROSPORY AND SEED HABIT

CC-2
UNIT- 4

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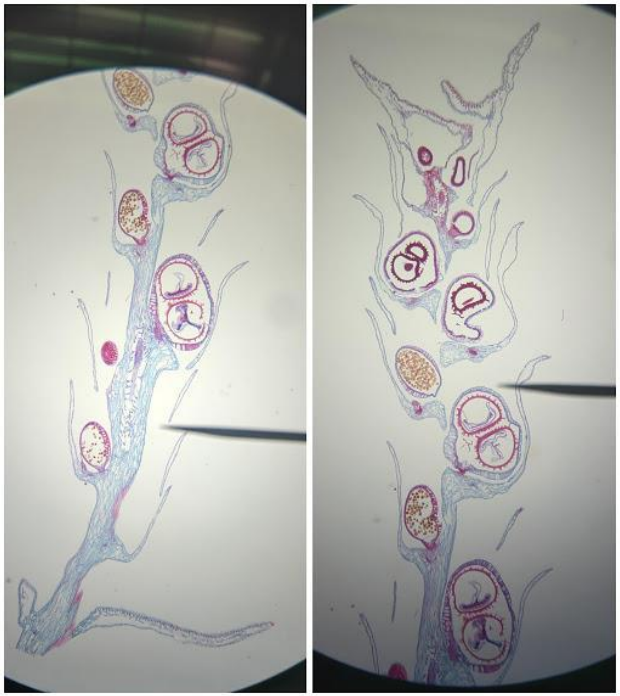
INTRODUCTION

- The first terrestrial plant appeared in the Silurian era.
- And so pteridophytes and ferns were born.
- These are all devoid of seeds.
- Reproduction: via several spore species.
- Seeds are not generated after sexual reproduction, but zygotes are.
- Along with the emergence of heterospory features connected to seed behaviour, the pteridophytic plant Selaginella also evolved.
- It is believed that heterospory is necessary for the production of seeds.

DEFINATION

Hetero means 'Different'. Two different kinds of spores produced by the same kind of plant. Differ in terms of number, size, structure, and developmental pattern. This type of spores- heterospores and the plants are heterosporus plants which are found in vascular cryptogames.



L.S. of strobili of *Selaginella sp.*

On the basis of number, size and Structure of spores

- Homosporous plants
- Heterosporous s plant

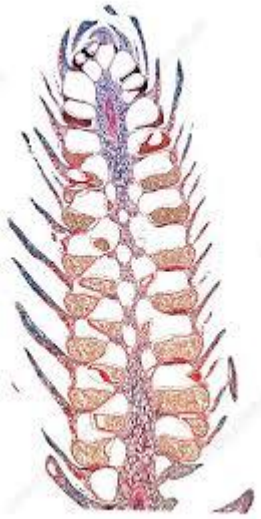
Homosporous plants

Only one type of sporangia and spores are produce in the same plant.

Ex.- *Lycopodium* sp.

Charistic Features:

- **Development eusporngiate type.**
- **Similar in size**



L.S. of *Lycopodium* sp cone

HETEROSPORY

- Spores of two types which are different in size.
- Small sized spores called microspores and sporangia they are produced known as microsporangium.
- Larger in size spores are called megaspores and sporangia they are produced known as megaaporangium.
- Male gametophyte after germination of microspores.
- Female gametophyte after germination of megaspores.

- A/d to Rashid (1976) only 9 generaof pterodophytes are heterosporous

Fig.Regnellidium

Fig.Marsilea

Fig.Salvinia

Fig.Azolla

Fig.Selaginella

Fig.Platyzoma

Fig.Isoetes

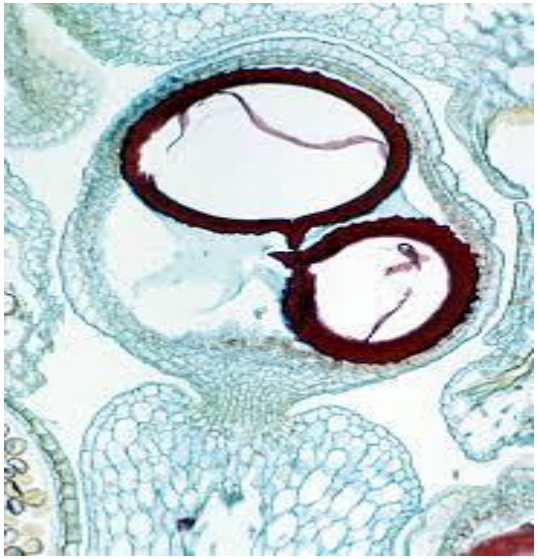
Fig.Pilularia

Fig.Stylites

CHARACTERS OF HETEROSPORY

- Leptosporangiate type of spore development.
- There are two different kinds of spores: 1) microspores, which are more numerous, and 2) megaspores, which are less. They get larger in size because they are receiving enough nourishment.

Selaginella *Microsporangium with many Microspores*



Selaginella **megasporangium with 2 megaspores**

ORIGIN OF HETEROSPORY

- It is widely acknowledged that heterospory is derived from homosporous condition which is primitive.
- Based on the evidence presented in

1. Palaeobotanical evidence
2. Data from research on development
3. Indications from research experiments

SIGNIFICANCE OF HETEROSPORY

- Distinctiveness between gametophytes
- The formation of a seed habit is very crucial.
- produced gametophytes that are endosporic.
- The developing embryo's point of origin is provided by endosporic development.
- Plants may now flourish in a variety of environmental situations, not just aquatic ones, thanks to heterospory.

SEED HABIT IN PTERIDOPHYTES

- The phenomenon known as "seed habit" resulted from the adoption of heterospory and the retention and germination of a single megaspore within a megasporangium to generate a female gemetophyte.
- One essential and comprehensive requirement for the production of seeds is heterospory.

SEED HABIT'S ORIGIN

- Only one megaspore develops in each megasporangium in heterospory.
- Decrease in the male gametophyte's size.
- Creation of the integument, an extra layer of covering.
- Throughout its life, the megaspore is present inside the megasporangium.
- Nourishment to support foetal growth.
- Apical portion of the nucellus is elaborated to accept pollen grains or microspores.

Selaginella is used as an example to show how pteridophyta evolved to become seed-bearing organisms.

- The occurrence of the heterospory phenomena- Megaspore germination occurs inside the megasporangium.
- A single megaspore developing inside a megasporangium.
- Megaspore retention inside megasporangium for the whole of its life, such as in *S. monospora* and *S. rupestris*, etc.
- While all of these symptoms stop the formation of the seed habit in *Selaginella* species, the seed cannot fully mature into a seed in the traditional sense.

ORIGIN AND DEVELOPMENT OF OVULE

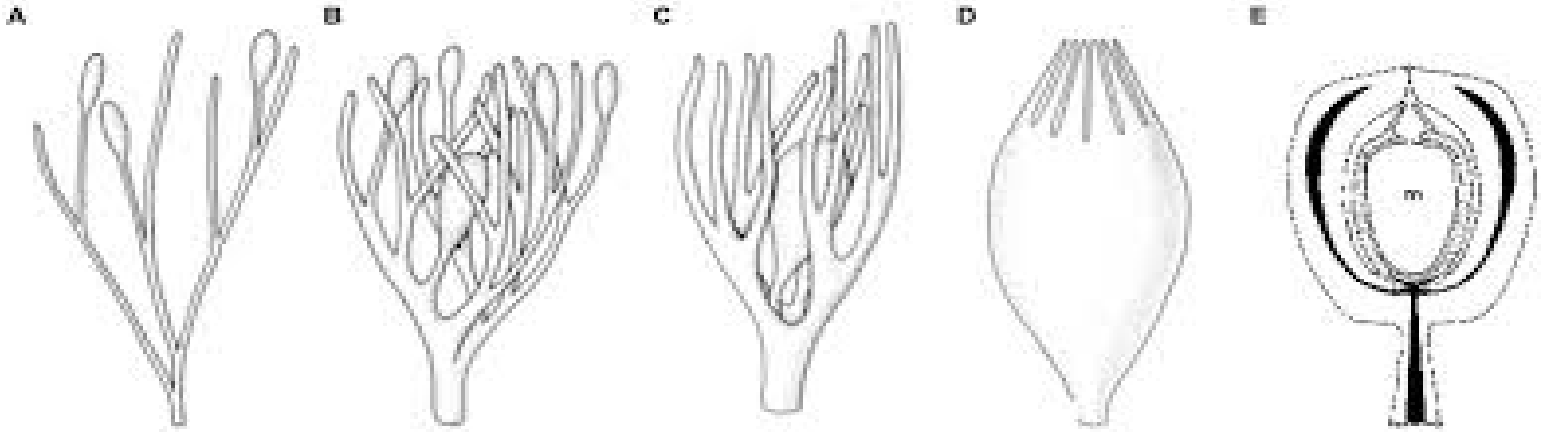
- The ability of spermatophytes to produce seeds is their most important characteristic.
- The ovule must mature before seeds can begin to form and develop.
- Numerous theories are put out to explain the formation and evolution of the ovule.

The concept of Telomere - A/d to Smith (1959), Long (1960), and Andrews (1960).

- The Rhynia type branching telome is a representation of the initial stage of development.
- A few of them are viable and produce terminal sporangia.

- First, there has been a decrease in megaspore counts.
- The megasporangium's upper portion increase in length.
- It was decided to build the structure that collects pollen grains.
- Sterile telomere alterations led to the development of the immune system.
- A structure resembling a cupule developed as a result of partial fusion of sterile telomeres.
- Cupule was originally separate from the nucellus, but subsequently the basal part of the cupule became attached.
- Found in the plant *Genomosperma latens*.
- Second integument evolved by linking these sterile telomes together, as in the case of *Genomosperma scotica.*
- In *Calathospermum scoticum*, the nucellus and the integument are connected.

- Because of lobe extinction and a decrease in the quantity of anterior lobes.
- When integuments unite, a micropyle is formed.
- Rather than the front of the body, the micropyle was where the process of collecting pollen grains began.
- The number of integuments and cupule lobes shrank even further.
- In the end, both integuments combined. Consequently, as a result of all procedures and other steps that follow.Since the majority of the fossil records that are now available support the Telome idea, it has become extremely well-known.



Various stages of origin of seeds

THE SIGNIFICANCE OF SEED HABITS

- Shield the embryo from unfavourable environmental circumstances.
- Give food
- parental attention for the growing embryo
- Possibility of hibernation
- Efficient distribution

CONCLUSION

- We can draw the conclusion that the development of seed habit and heterosporus condition are related.

- The formation of seed habit is significantly influenced by seleginella's heterospory, and higher plants may have evolved their seed habits as a result.

THANK YOU