Heterospory and Seed Habit

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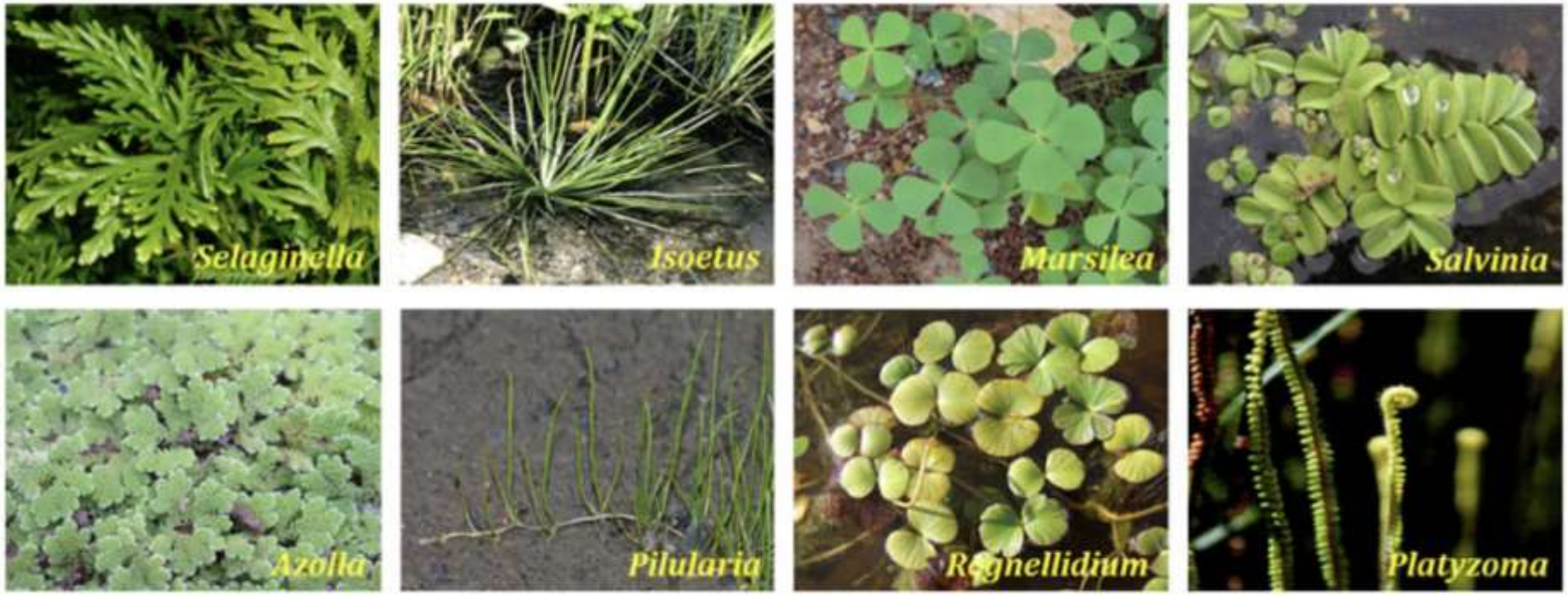
What is Heterospory?

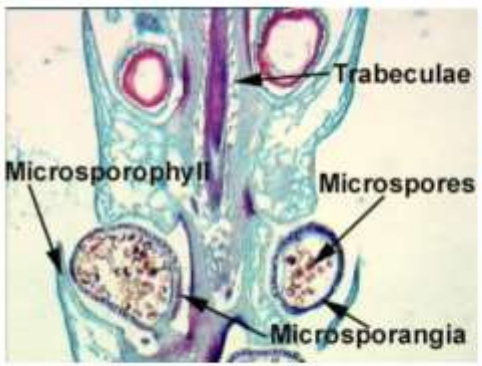
Heterospory is a condition of the production of more than one type (usually two) of spores in a single plant. These two types of spore differ in their formation, structure and most importantly its functions and sexuality.



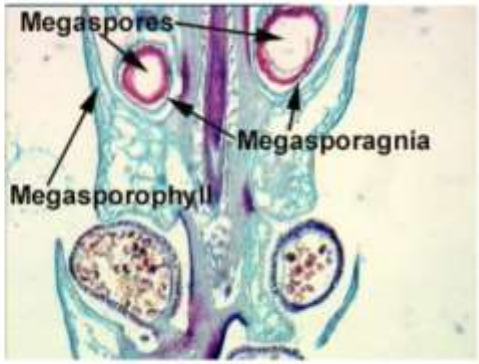
Living Representatives of Pteridophytes with Heterosporous Condition

Living species of Pteridophytes showing heterospory

Eight living species of Pteridophytes, they are *Selaginella*, *Isoetus*, *Marsilea*, *Salvinia*, *Azolla*, *Pilularia*, *Regnellidium* and *Platyzoma*.



Male Structures



Female Structures

In **Pteridophytes**, these two spores are called as **Microspores** and **Megaspores**.

Microspores:

Microspores are small sized spores produced in large numbers inside the **microsporangium**. They are male spores which on germination produce male gametophyte.

Megaspores:

Megaspores are comparatively larger spores produced in limited numbers inside the **megasporangium**. They are female spores which on germination gives rise to female gametophyte.

Biological importance of Heterospory

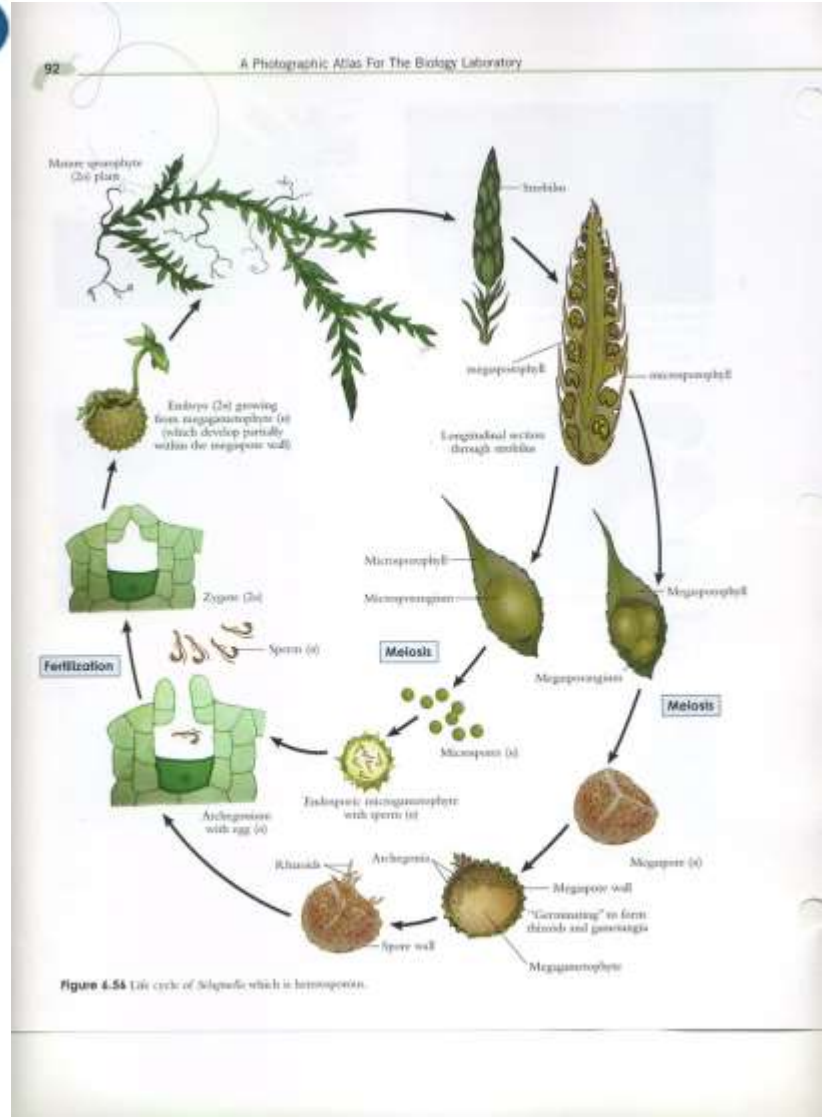
The phenomenon of Heterospory is of great biological advantage because of the fact that a large megaspore which contains female gametophyte derives its food from the sporophyte, and is independent of the external conditions as might interfere with the growth of a free living gametophyte. It thus forms better starting point for the new embryo, than an independent green prothallus which has to manufacture its own food.

In brief, the origin of seed habit is associated with the following important prerequisites

1. The production of two kinds of spores (i.e., Heterospory).
2. The retention and germination of the fertilization of the egg and embryo formation, which is still within germinating megaspore.
3. Development of only one megaspore per megasporangium.

Steps for the development of seed habitat from heterosporous condition

- Production of two types of spores (heterospory)
- Reduction in the number of functional megaspores
- Permanent retention of megaspore within the megasporangium
- Developments for the availability of sufficient nutrition
- Formation of protective layers (integuments) around the megasporangium
- Development of organic connection between the megasporangial wall and the megaspores.
- Development of pollination mechanism
- Retention of young embryo inside the megaspore wall
- Development of seed with protective layers
- Development of seed dispersal mechanism



In *Selaginella*, there is remarkable approach to the seed habit, on account of the following important features:

- *Selaginella* shows heterospory.
- The megaspore usually germinates within the megasporangium and is not shed for a time which may vary from species to species.
- There is reduction to one megaspore in some species, e.g., *S. rupestris* and *S. monospora* and a confirmed tendency to reduction in others.

It becomes quite evident that *Selaginella* has considerably advanced towards the seed habit in a few species, but its approach to the true seed is not complete due to the following features:

1. The megasporangium lacks an integument or covering.
2. The permanent retention of the megaspore within the megasporangium has not become established.
3. After the development of the embryo, the resting period is not there.

Thank You