

Tutorial 01e

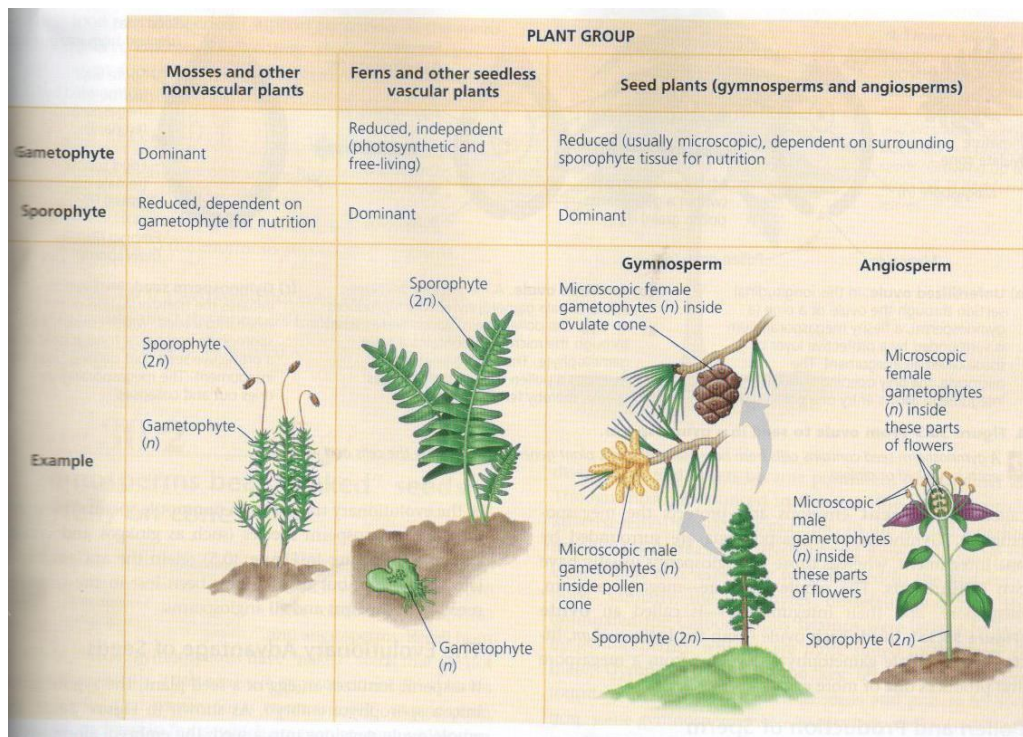
Study Unit 5

Thanks for your involvement in making this group an interactive one. If you are yet to participate, Please do.

*As it has been mentioned in my welcome address that all the tutorials will be based on what the Lecturer has designed. Even though, I tried (and will try in subsequent ones) to simplify the module for the purpose of your understanding, I would like to say that **IT IS NOT EXHAUSTIVE IN ITSELF**. Hence, onus lies on you to study and study to ensure maximum achievement. To this effect, only highlight excerpt are presented here. This also will cut across all tutorials that I would be pastina on mvunisa.*

Adaptation: is the inherited characteristic of an organism that enhances its survival and reproduction in a specific environment

Adaptation of plants for land life



Picture1: gametophyte-sporophyte relationships in different plant groups

- Reduced gametophyte:**
 Gametophytes in seeded plants are mostly microscopic, and enhance its protection from adverse weather conditions.

The moist in the sporophyte protect the tiny gametophyte from UV ray and drying. The gametophyte takes up nutrients from the sporophyte (gametophyte-sporophyte relationship)

Heterospory:

Seeded plants are heterosporous that is, they produce two kinds of spores: 1) mega sporangia produce megaspores which give rise to female gametophyte



2) Microsporangia which produces microspore and gives rise to male gametophyte

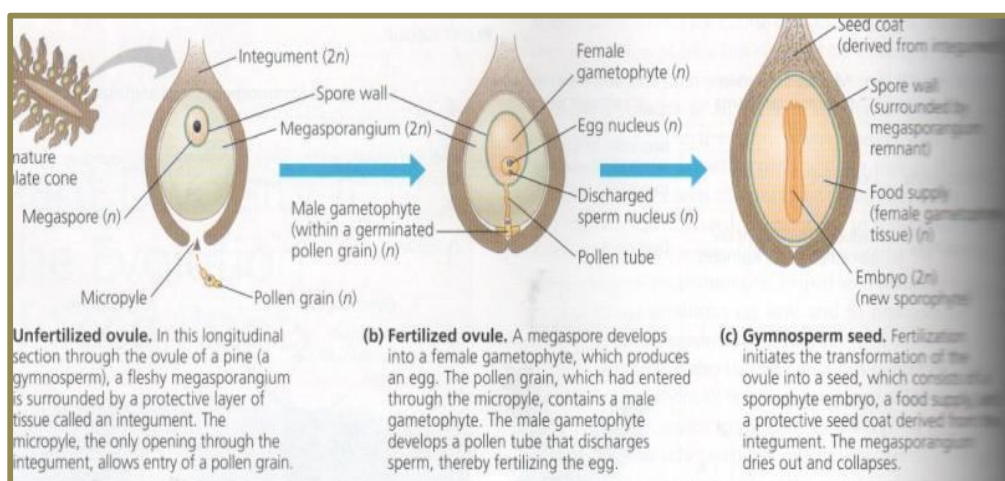


Ovules and pollen

Seeded plants retain their megasporangium within the parent sporophyte. The integument is the layer covering and protecting the mega sporangium. The megasporangium, megaspore and the integuments is called ovule.

Pollen grain

Microspore develops into pollen grains. The pollen wall is tough and it is designed to protect the pollen grains while transported by wind or animals. The transfer of pollen grains to the ovule of a plant is called pollination. The pollen grain is germinate grow into pollen tube and discharge sperm into the female gametophyte in the ovule. Ovule develops into seed after fertilization



Picture 2 from ovule to seed in gymnosperm

Seed consists of:

- **Embryo** that develops after fusion of the egg cell with sperm cell i.e. fertilization
- **Food supply**
- **Testa** (seed coat) from integument

Adaptation of seeded plants on land

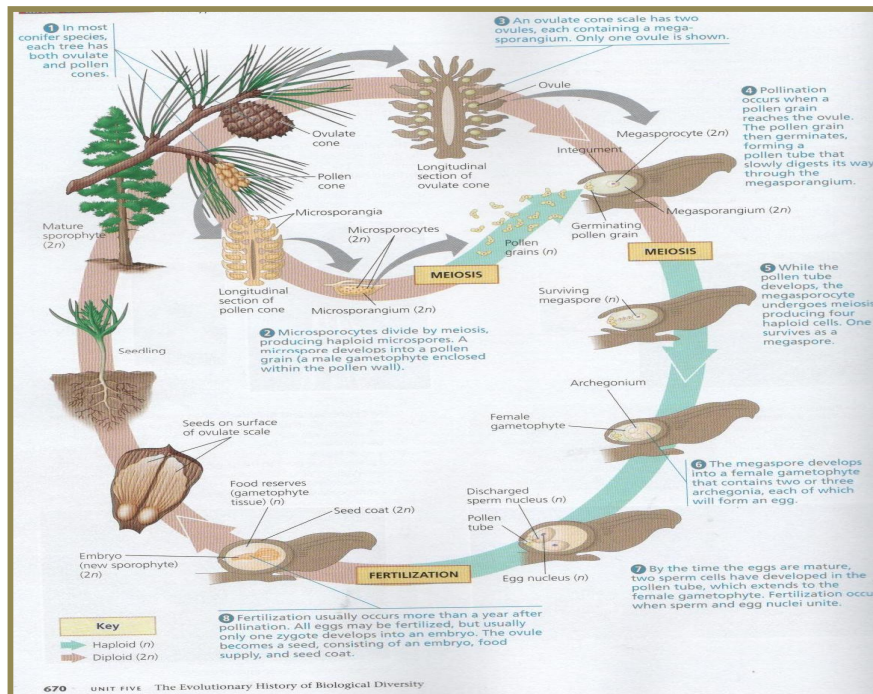
Seed has a protective seed coat and layer of tissue, they are multicellular, seed has a long life span after detachment from the parent plant, they also have supplied stored food.

Spore single celled, have short life span, they have no coat of stored food supply.

The four phyla of Gymnosperm

phyla of Gymnosperm	Example
Cycad	Encephalartos woodii
Ginkgo	Ginkgo biloba
Gnetophytes	Gnetum
Conifers	Wollemia nobilis

- **Cycad** they are dioecious i.e. have separate sexes it is an important part of the Mesozoic diversity



Picture 3: life cycle of pine

The three productive adaptations of seed plants are:

- increasing dominance of sporophytes
- The advent of the seed as a resistant dispersible stage in life cycle
- The appearance of pollen as airborne agents that brings gamete together

Angiosperm

A flower has four sporophyll called floral organ: two are non fertile floral organs: sepals and petals. The other two are fertile floral organs: the stamen and carpels

Non Fertile
floral organs

- **Sepals** are found at the base of the flower and are usually green in colour. It ecloses the flower before it opens
- **Petal: found** in the interior part to the sepal. They are brightly coloured and attracts agent of pollination

Fertile floral
organs

- **Stamen- A male organ.** It produces microspore that develops into pollen grains containing male gametophyte. Stamen is made up of the stalk called filament, and anther where pollen are produced
- **Carpels – A female organ.** it produces the megaspore. The tip of the carpel is the sticky stigma which receives the pollen grain and the style which leads the stigma into the ovary at the base of the carpel. The ovary contains one or more ovules

Fruit is a matured ovary. The seed develops from the ovule after fertilisation, the walls of the ovary then thickens

Plant fertilization

The male gametophyte present in the pollen grain develops within the microsporangia in the anther male gametophyte consists of a generative cell and a tube cell. The generative cell divides to form two sperms

The female gametophyte is contained in the embryo sac. The pollen grain is released from the anther and it is carried to the stigma at the tip of the carpel of the flower. If it is the anther and the stigma is of

the same plant it is called self pollination. But if the anther and the stigma are from different plant it is called cross pollination

Cross pollination is the transfer of pollen from the anther of a flower of one plant to the stigma of a flower of another plant of the same species. The pollen grains absorb water after adhering to the stigma of the carpel. The tube cell produces pollen tube that grows down the style after getting to the ovary, the pollen tube penetrate through the micropyle- a pore in the integument of the ovule and releases the two sperm cells. One sperm cell fertilizes the egg forming diploid zygote; the other fuses with the two nuclei in the female gametophyte and produces a triploid cell. This is called Double fertilization. One fertilisation produces zygote, the other fertilization produces triploid cell

Angiosperms is classified based on their cotyledon (seed leaves) into two: Monocots and dicots

Dicots is later classified as 1) Eudicot ('true' dicots), 2) basal angiosperm (oldest lineage) and 3) magnoliids

Differences between monocots and dicots	
Monocots	Dicots
One cotyledon	Two cotyledon
Parallel veins	Netlike veins
Vascular tissue scattered	Vascular tissue usually arranged in ring
Fibrous root system	Tap root usually present
Pollen grain with one openings	Pollen grains with three openings
Floral organs usually in multiples of three	Floral organs usually in the multiples of four or five