

Ch → 3

Plant Kingdom

Artificial System of Classification

- Earliest System
- Morphological / superficial → habit, colour, number, shape of leaves, etc.
- Mainly based on → Vegetative characters and Androecium structure.
- Aristotle
- Carolus Linnaeus → Morphology of Androecium (Sexual system of classification)

Disadvantage



- Separate the closely related species
- This system gave equal weightage to vegetative and sexual characteristics.

Natural Classification System

- Based on Natural affinities
- Internal Features like - Ultra structure
Anatomy
Embryology
Phytochemistry
- George Bentham and Joseph Dalton Hooker

Phylogenetic Classification System

- Based on Evolutionary relationships.
- Most accepted.

Numerical taxonomy / Phenetics

- Computers
- Based on all observable characteristics.
- Number and codes.
- Each character is given Equal weightage.
- Hundred of characters can be considered at the same time.

Cytotaxonomy

- Based on Cytological information like chromosome number, cell structure, behaviour.

Chemotaxonomy

- Chemical constituents of the plant.
e.g. DNA, RNA, Protein.

Algae

Bryophytes

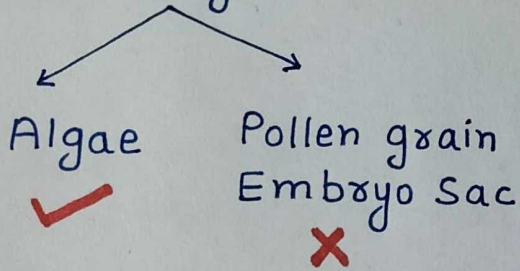
Pteridophytes

Gymnosperms

Angiosperms

Gametophyte

- Haploid (n)
- Multicellular
- Form Gametes (n)
- by Mitosis
- Sex Organ



Sporophyte

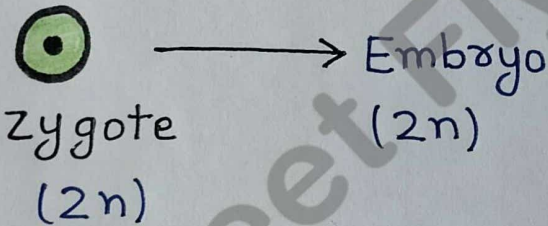
- Diploid ($2n$)
- Multicellular
- Unicellular in Algae.
- Spores formation (n)
- by Meiosis

Spermatophyta

- Seed bearing Plants.
- e.g. Angiosperms
- Gymnosperms

NOTE: Algae, Bryophytes & Pteridophytes
→ SEEDS absent

Embryophyte



- Bryophyte
- Pteridophyte
- Gymnosperms
- Angiosperms

Tracheophytes

- Vascular bundles (Xylem & Phloem) present.
- e.g. Pteridophytes, Gymnosperms, Angiosperms.

Statements

- All tracheophytes is spermatophyta
→ No, Exception Pteridophytes
- All spermatophyta is Tracheophytes
→ Yes

Archegoniates

- Archegonium
- ↓
- Female Multicellular Sex Organ
- e.g. Bryophyte
Pteridophyte
Gymnosperm

Flowering plant → Angiosperms

Cryptogam

Hidden SEX Organ

- Algae
- Bryophyte
- Pteridophyte

Phanerogams

Visible

- Gymnosperm
- Angiosperm

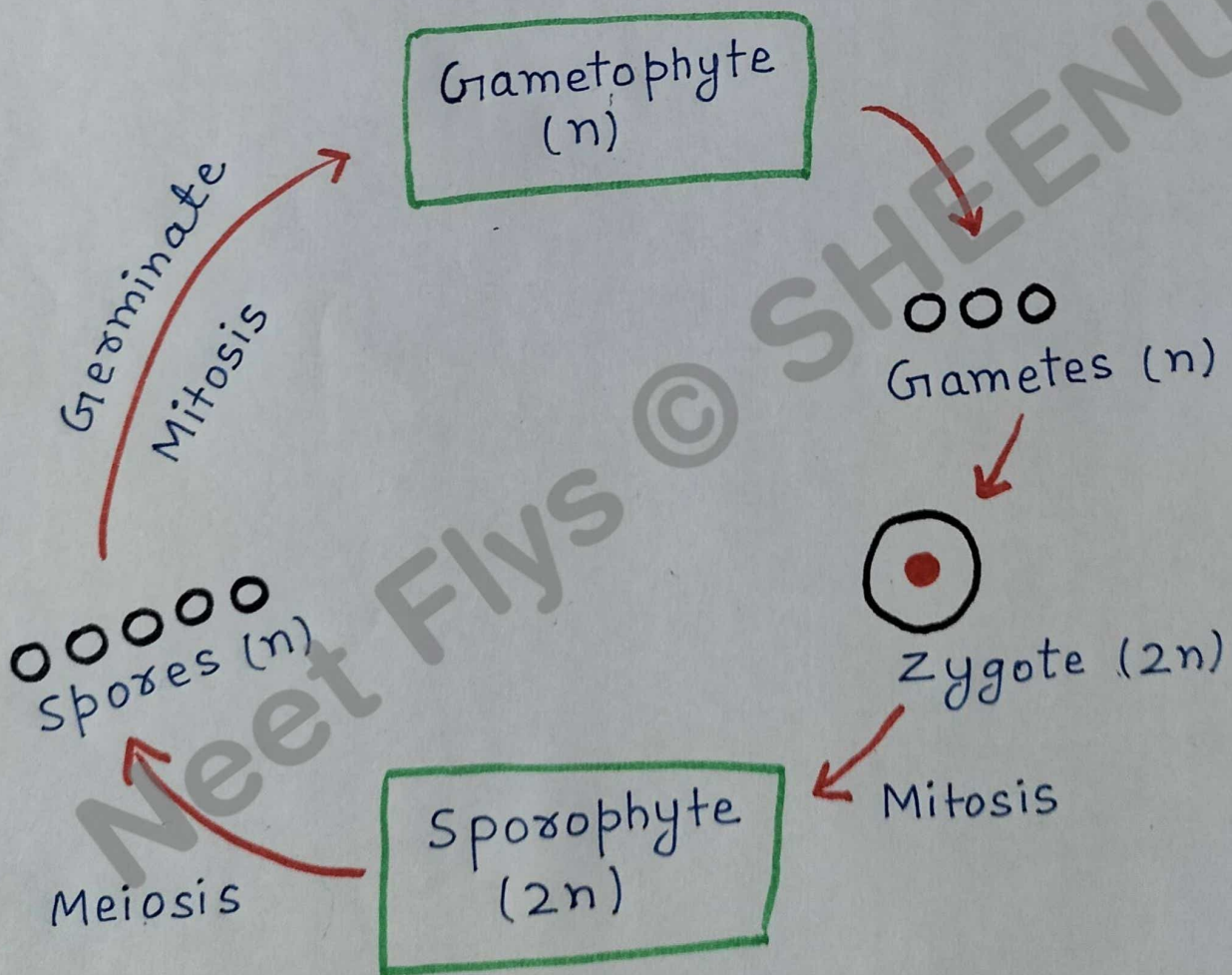
Haploid and Diploid plant

- In all plants both Haploid and Diploid stages are present.
- If plant maximum time of Life cycle or maximum cell spend as Haploid $\rightarrow$ Haploid Plant.
- If plant maximum time of Life cycle or maximum cell spend as Diploid $\rightarrow$ Diploid Plant.

Algae, Bryophyte $\rightarrow$ Haploid

Pteridophyte, Gymnosperm, Angiosperm $\rightarrow$ Diploid

Alternation of Generation



- Both Haploid (n) and Diploid ($2n$) phase is present in an organism.

- In plant Haploid phase (n) $\rightarrow$ Gametophyte
Diploid phase ($2n$) $\rightarrow$ Sporophyte

- In Algae & Bryophyte - Haploid phase



Green, Photosynthetic,
Main plant body

$\rightarrow$ They are Haploid Plant.

- In Pteridophyte, Gymnosperms, Angiosperms

$\rightarrow$ Main Plant body

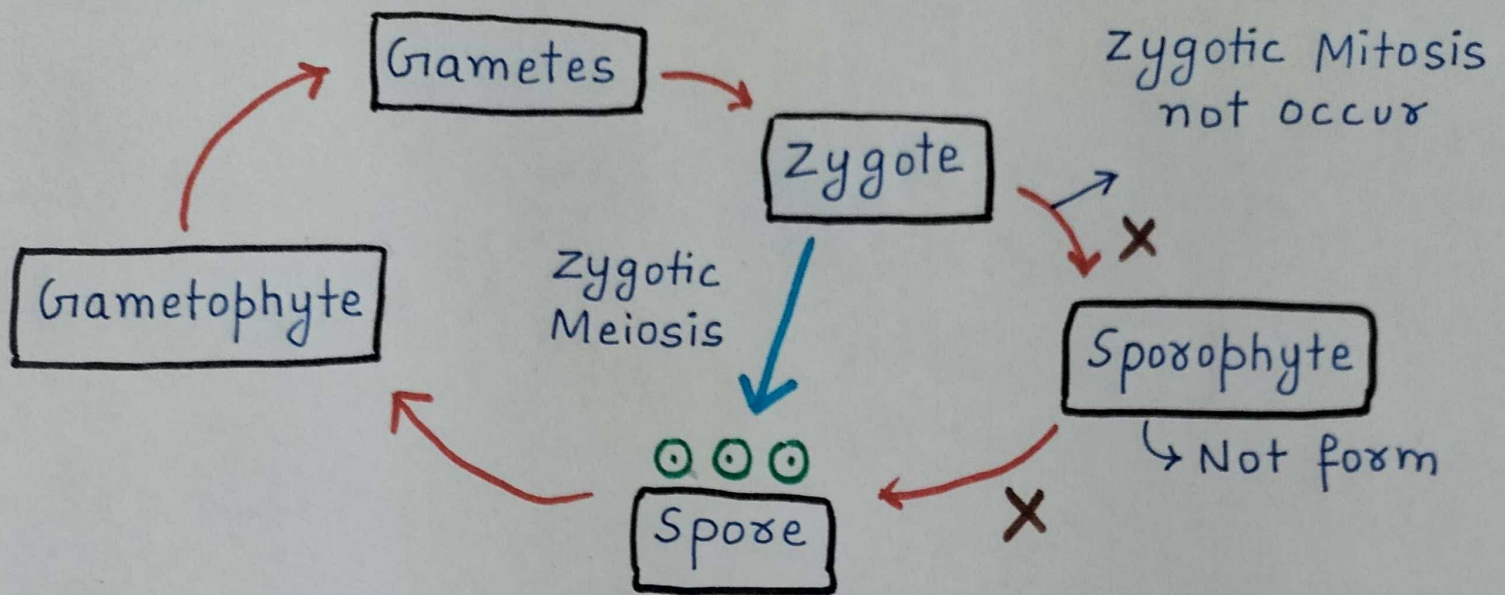
Dominant Stage

Green, Photosynthetic

$\rightarrow$ They are Diploid plant / Sporophyte.

Organism	Life cycle
Haploid Plant	Algae $\rightarrow$ Haplontic
	[Bryophyte] Haplo diplontic
	[Pteridophyte]
Diploid Plant	[Gymnosperm] Diplontic
	[Angiosperm]

Haplontic



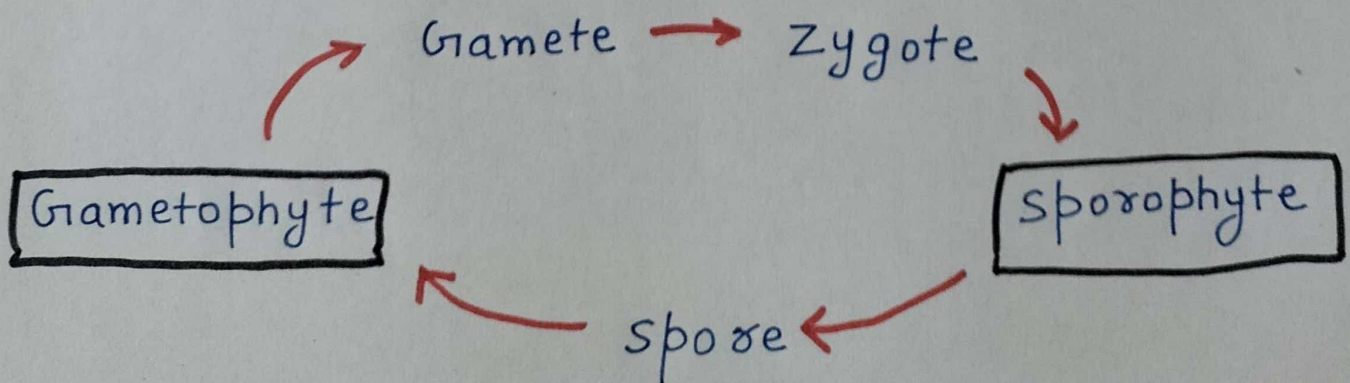
→ Both Haploid & Diploid stage present but Diploid stage highly Reduced → (Very Less cell → single celled) Zygote

- Many Algae such as → Volvox, Spirogyra and some species of Chlamydomonas.

Algae Life Haplontic -

- Sporophyte **X**
- Zygotic Meiosis **✓**
- Zygotic Mitosis **X**
- Diploid stage - Highly Reduced

Haplo-diplontic → Bryophyte, Pteridophyte

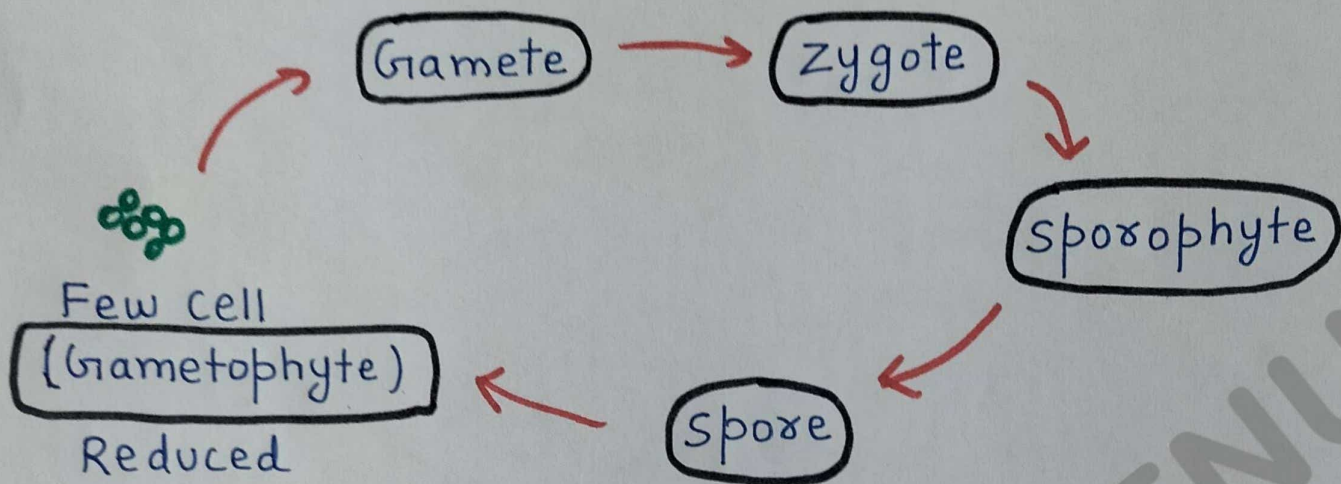


- They differ in their dominant phases.
- Bryophyte → Haploid → Main plant Gametophyte.
- Pteridophyte → Diploid → Main plant Sporophyte.

All algae is haplontic

Except - Ectocarpus, polysiphonia, kelps.

Diplontic Life Cycle → Gymnosperms, Angiosperms



Haploid stage Reduced → Less number of cell.

e.g.. An alga, Fucus.

Questions

- ① Phylogenetic system of classification is based on
- (a) Morphological Features
 - (b) chemical Constituents
 - (c) Floral characters
 - ☒ (d) Evolutionary relationships
- ② Phenetic classification of organisms is based on
- ☒ (a) Observable characteristics of existing organisms.
 - (b) ancestral Lineage
 - (c) Sexual characteristic
 - (d) Based on DNA characteristic
- ③ System of classification used by Linnaeus is
- (a) Natural system
 - ☒ (b) Artificial system
 - (c) Asexual system
 - (d) Phylogenetic system
- ④ Classification given by Bentham and Hooker is
- (a) Artificial
 - ☒ (b) Natural
 - (c) Numerical
 - (d) Phylogenetic
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1. Non Embryophyta + Non-Vascular → Algae.
2. Embryophyta + Attracheophyte → Bryophyte
3. Spermatophyta + Vascular + Archegoniate - Gymnosperm
4. Cryptogam - Vascular → Pteridophyte.