PLANT LIFE CYCLES AND ALTERNATION OF GENERATIONS

- In plants, both haploid and diploid cells can divide by mitosis. This ability leads to the formation of different plant bodies - haploid and diploid.
- The haploid plant body / gametophyte produces gametes by mitosis. This plant body represents a gametophyte.
- Following fertilisation, the zygote also divides by mitosis to produce a diploid sporophytic plant body.
- Haploid spores are produced by this sporophytic plant body by meiosis.
- Spore in turn, divide by mitosis to form a haploid plant body once again.
- Thus, during the life cycle of any sexually reproducing plant, there is an alternation of generations between gamete producing haploid gametophyte and spore producing diploid sporophyte.
  However, different plant groups, as well as individuals representing them, differ in the following patterns:

Haplontic Life Cycle

- The main plant body is haploid gametophyte.
- The dominant, photosynthetic phase in such plants is the free-living gametophyte.
- Gametophyte divide mitotically to form haploid gamete.
- Fertilization of gamete leads to formation of zygote (2N)
- Sporophytic generation is represented only by the one-celled zygote.
- There are no free-living sporophytes.
- Meiosis in the zygote (zygotic meiosis) results in the formation of haploid spores.
- The haploid spores divide mitotically and form the gametophyte.
- This kind of life cycle is termed as haplontic.
  E.g. Ulothrix, Spirogyra and Volvox.

Diplontic Life Cycle

- Diploid sporophyte is the dominant, photosynthetic, independent phase of the plant.
- Sporophyte undergo meiosis for gamete formation (gametic meiosis) or spore formation (Sporic meiosis).
- The gametophytic phase is represented by the single to few-celled haploid gametophyte.
- This kind of life cycle is termed as diplontic.
  E.g. Gymnosperm and angiosperm. Some green algae- (Caulerpa), some brown algae – (Fucus, Sargassum)

Haplodiplontic Life Cycle

- Bryophytes and pteridophytes, interestingly, exhibit an intermediate condition (Haplo-diplontic); both phases are multicellular and often free-living.
  E.g. Algae - Ectocarpus, Polysiphonia and Kelps
  Bryophyte - Dominant gametophyte
  Pteridophyte - Dominant sporophyte