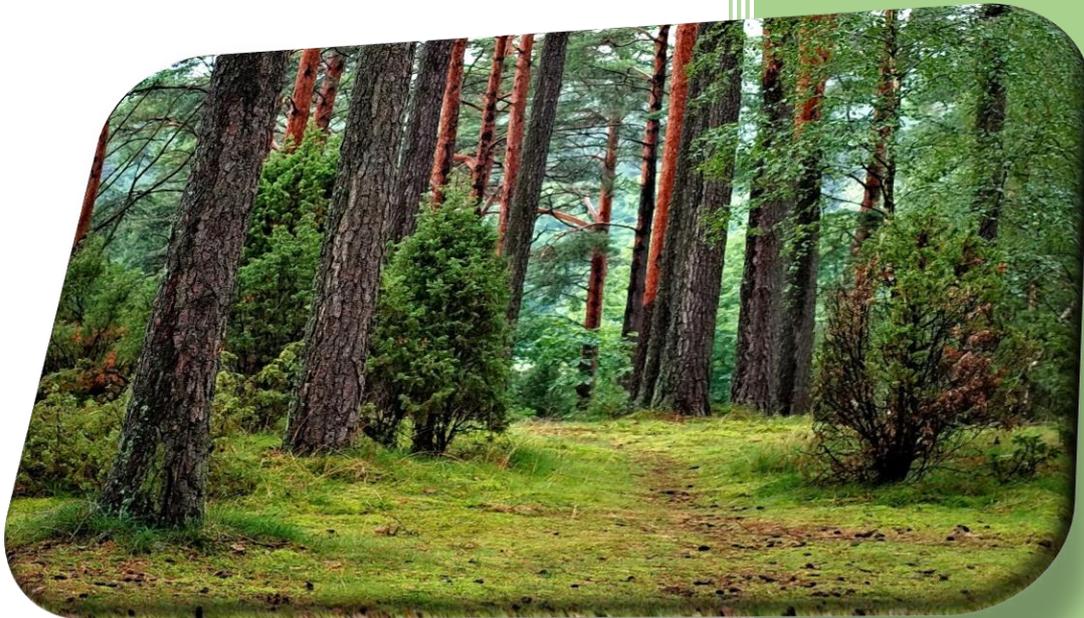


**ATOMIC ENERGY CENTRAL SCHOOL,
INDORE**

BIOLOGY- STANDARD XI

MODULE 3.3



UNIT 1 :
DIVERSITY IN THE LIVING WORLD
CHAPTER 3 :
PLANT KINGDOM

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PGT(SS) - BIOLOGY

Gymnosperms

- ✚ The gymnosperms (Gymnos = naked; sperma = seeds) are plants in which the ovules are not enclosed by any ovary wall and remain exposed, both before and after fertilisation.
- ✚ Unlike bryophytes and pteridophytes, in gymnosperms the male and the female gametophytes do not have an independent free-living existence.
- ✚ They remain within the sporangia retained on the sporophytes. These plants are mostly found in colder parts of northern hemisphere, where they form extensive forests.
- ✚ A number of gymnosperms are now, known as ornamentals, e.g., Ginkgo, Thuja, Araucaria, etc.

Morphology

- ✚ Gymnosperms include, medium-sized trees or tall trees and shrubs. The giant red wood tree Sequoia. Species of Gnetum are woody climbers. The smallest gymnosperm is Zamia pygmaea.
- ✚ Roots in some genera have fungal association in the form of mycorrhiza {Pinus), while in some others {Cycas) small specialised roots called coralloid
- ✚ Roots are associated with N₂-fixing cyanobacteria such as Anabaena, Nostoc.
- ✚ The stems are branched {Pinus, Cedrus) or unbranched {Cycas).
- ✚ The leaves may be simple or compound.
- ✚ The megaspore mother cell is enclosed within the megasporangium (nucellus) and develops into a multicellular female gametophyte, bearing two or more archegonia of female sex organs.
- ✚ The multicellular female gametophyte is also retained within megasporangium.
- ✚ The male gametes are carried to the archegonia, i.e., gamete in the ovule by means of a tube called pollen tube and discharge their contents near the mouth of the archegonia. This is called siphonogamy. Following fertilisation, zygote develops into an embryo and the ovules into seeds.
- ✚ The seeds contain food laden tissue called endosperm.
- ✚ It lies naked or exposed.
- ✚ Endosperm provides nourishment for growth of seedling at the time of seed germination.
Examples Cycas, Pinus, Ginkgo, Ephedra, Gnetum, Vaucheria, Cedrus, Abies, etc.

Angiosperms

- ✚ Angiosperms are seed bearing plants or flowering plants.
- ✚ Unlike gymnosperms where the ovules are naked.
- ✚ In angiosperms the sporophyll are organised into flowers and the seeds are produced inside fruits.
- ✚ Zostera is a marine angiosperm.
- ✚ These plant are sporophytic, in the form of herbs, shrubs, trees, climber creepers, etc.
- ✚ The smallest angiosperm is water plant Wolffia and tallest is Eucalyptus regnans.
- ✚ Primary root develops from radicle. It forms tap root system.
- ✚ In many angiosperms roots develop from places other than radicle, these are adventitious roots.
- ✚ Stem develops from plumule.
- ✚ These are simple or compound. The leaves bear axillary buds which can grow into stem branches.
- ✚ Angiosperms have vessels in xylem. Phloem contains sieve tubes and companion cells in regard to gymnosperms which do not have companion cells.
- ✚ Flowers are the reproductive structures formed by the union of one or both types of sporophylls (microsporophylls or stamens and megasporophylls or carpels).
- ✚ Stamens are considered as the male sex organs of a flower. An anther contains four microsporangia, each developing into a pollen grain. Carpel or pistil is called the female sex organ of the flower.
- ✚ A megaspore mother cell is differentiated in the nucellus and undergoes meiosis, ultimately one functional megaspore gets enlarged and forms the female gametophyte known as embryo-sac.
Each cell of an embryo sac is haploid.
- ✚ Fertilisation and Development of a Seed: Each pollen grain germinates on the stigma forming a pollen tube that carries two male gametes to the embryo sac, growing through the tissues of stigma and style.
- ✚ **Alteration of Generation**
Different plant groups and individual have different features in their life cycle.

Haplontic

The dominant photosynthetic phase is a gametophyte produced by haploid spores. Meiosis in the zygote results in formation of haploid spores.

Diplontic

In this type, the diploid sporophyte is the dominant. The multicellular diploid phase is called sporophyte. The gametophytic phase is represented by the single to few celled haploid gametophyte.

Haplodiplontic

In this type, there are two distinct multicellular phases, diploid sporophyte and haploid gametophyte are present. Both phases are multicellular.

References

1. NCERT. BIOLOGY TEXTBOOK FOR CLASS XI
2. CONCEPTS OF BIOLOGY (R.L. KOTPAL / BENDRE/TYAGI)

<https://www.ruf.rice.edu/~bioslabs/studies/invertebrates/kingdoms.html>