

Subject - Botany

By- Dr. Deepti Sharma

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Paper - I (Diversity of Algae, Lichens and Bryophyta)

Unit- III

Topic- General characters of Bryophytes

Meaning of Bryophytes

The name Bryophytes came from the two Greek words “Bryon” (moss) and “phyton” (plant). Bryophytes are the simplest and primitive plants among the embryophytes (Embryophytes are the plants where the zygote forms an embryo). This is the first group of plants to invade the land, though they require water for their fertilisation.

Therefore, they are regarded as plant amphibians. Bryophytes are small and herbaceous plants. Unlike most of the higher plants, bryophytes are not found as single individuals but in groups that grow closely packed together in mats or cushions on rocks, soil, or as epiphytes on the trunks and leaves of forest trees, or as free-floating in water.

At present this group is represented by 1,237 genera and about 18,000 species.

They flourish particularly well in moist, humid forests like the fog forests of the Pacific northwest or the mountain rain forests of the southern hemisphere.

In India, they are mostly confined to the eastern and northern Himalayas and the Nilgiri and other hills.

General Characteristics of Bryophytes

1. The life cycle of bryophytes is distinctly differentiated into gametophytic and sporophytic phases (heteromorphic).
2. The gametophytic phase is predominant and ecologically persistent, i.e., green, independent and long-lived.
3. The sporophytic phase is very short-lived, and completely dependent upon the gametophyte.
4. Unlike most of the higher plants, bryophytes are not found as single individuals but in groups of individuals which have characteristic features depending on their family, genus or species.
5. The gametophytic plant body is either thalloid or differentiated into the erect axis (stem) and lateral appendages (leaves).

6. Roots are absent in bryophytes. The rhizoids perform the function of roots.

They are either unicellular and unbranched or multi-cellular and branched.

7. They never form xylem tissue, the special lignin-containing water-conducting tissue that is found in the sporophytes of all vascular plants. However, the plant body is made up of parenchymatous cells only.

8. They reproduce by vegetative and sexual methods. Asexual reproduction is completely absent in bryophytes.

9. Vegetative propagation takes place by some special structures, like gemmae, tubers, protonema, cladia, innovation, etc.

10. Sexual reproduction is only of oogamous type. They produce large, multicellular sex organs for reproduction. Bryophytes are unisexual, either homothallic (monoecious) or heterothallic (dioecious).

11. The male sex organs, called antheridia, are stalked, globose or ovoid with one celled thick jacket surrounding androgonial mother cells.

12. The female sex organs, called archegonia, are vase-shaped or flask-shaped structure having the basal swollen venter containing a ventral canal cell and an egg, and the upper elongated neck containing neck canal cells.

Both the venter and neck are surrounded by the sterile jacket.

13. The sperms are motile and biflagellate having two whiplash flagellae.

14. Bryophytes require water for sperm dispersal and subsequent fertilisation.

15. The sperms move short distances in the water film and ultimately reach the open necks of the archegonia. The slimy mucilage secretions in the archegonial neck help to pull the sperm downward to the egg.

16. The zygote does not pass any resting phase. Embryonic growth of the sporophyte begins within the venter of the archegonium soon after fertilisation.

17. The embryo follows exoscopic mode of development. In this development, the zygote first divides transversely to form an outer epibasal cell and an inner hypobasal cell and the embryo develops from the epibasal cell.

Thus, the shoot forming apical cell is directed outwards,

i.e. towards the neck of the archegonium.

18. The sporophyte consists of only bulbous foot, with or without an unbranched seta and a single terminal sporangium. Sometimes the sporophyte is represented only by a capsule (Riccia). The capsule has a protective cover-ring called calyptra which is a part of gametophyte.

As the sporophyte of bryophytes is monosporangiate (containing a single sporangium), they are called sporogonium.

19. Bryophytes are homosporous — isospores (spores are identical morphologically and physiologically) are produced from the sporogenous cells of the capsule.
20. The spore after germination either produces a filamentous germ tube that gives rise to a young gametophyte (Riccia, Marchantia) or produces a protonema which bears leafy buds that will ultimately form the adult gametophytic shoot.