

B.Sc.I (Botany). Paper II
Vegetative reproduction in Bryophytes

BY Dr. Kumudini Indira Toppo
Govt. V.Y.T.P.G. Autonomous College Durg

Most of the Bryophytes are characterized by their ability to propagate by vegetative methods. Cavers (1903) have given a comprehensive account of the vegetative propagation in bryophytes. The vegetative reproduction takes place in favourable season for vegetative growth. Majority of the Bryophytes propagate vegetatively and it is brought about in many ways.

Following are some of the common methods of vegetative propagation in Bryophytes.-

1. By death of older parts of the thallus or fragmentation.
2. By tubers.
3. By gemmae.
4. By adventitious branches.
5. By innovation.
6. By primary protonema.
7. By secondary protonema.
8. By bulbils.
9. By cladia.
10. By persistent apices.

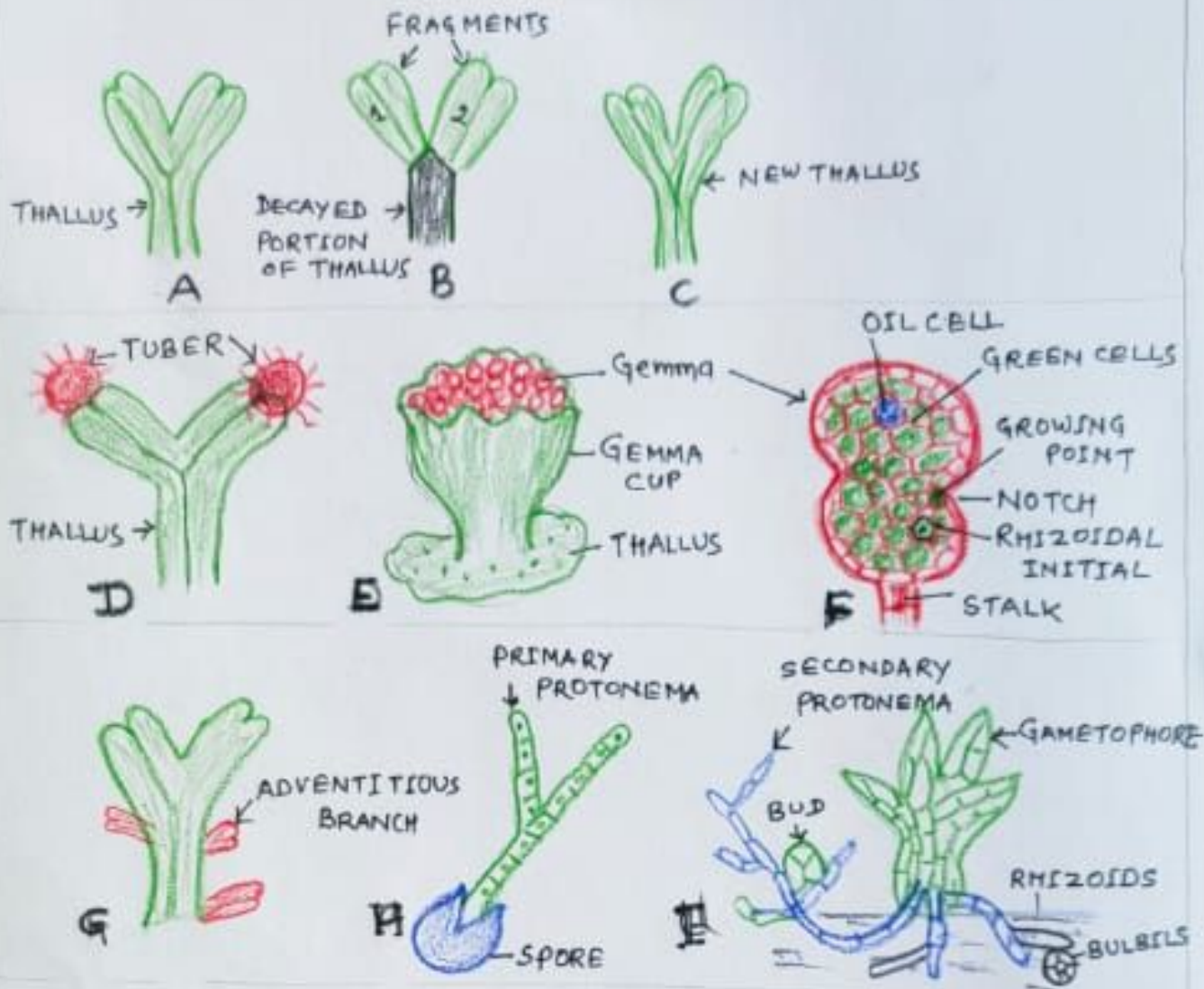


FIG. 1. A-I VEGETATIVE REPRODUCTION IN BRYOPHYTES

1. By death of older parts of the thallus or fragmentation:

This method of vegetative propagation is commonly found in many Bryophytes. In *Riccia*, *Marchantia*, *Anthoceros*, *Notothylas* and others the progressive death and decay of older parts reach to the dichotomy, the lobes of the thallus get detached. These detached lobes or fragments develop into independent plants by apical growth.(Fig 1.A-C)

2. By tubers:

Towards the end of the growing season, the subterranean branches get swollen at their tips to form the underground tubers. On the periphery of a tuber are two to three layers of water proof corky, hyaline cells develop. These layers surround the inner cells which contain starch, oil globules and albuminous layers. During the unfavorable conditions the thallus dies out but the dormant tubers remain unaffected. The tubers germinate into new thalli on the approach of favorable conditions e.g., *Riccia*, *Anthoceros*, *Fossombronia* etc. Thus, tubers also serve as organ of perennation (Fig1..D)

3. By gemmae.

Gemmae are green, multicellular reproductive bodies of various shapes. These are produced in gemma cups, on the surface of the leaves, on stem apex or even inside the cells. They get detached from the parent plant and after falling on a suitable substratum gemmae give rise to a new individual directly e.g., *Marchantia* or indirectly e.g., Mosses (Fig 1..E-F).

4. By adventitious branches:

According to Cavers (1904) several species of *Riccia* produce adventitious branches from the ventral surface of gametophyte; these branches on being detached may result in the formation of new gametophytes. Such adventitious branches have also been recorded from other bryophytes, e.g., *Marchantia*, *Anthoceros* sp.(Fig1.G)

5. By innovation

In *Sphagnum* one of the branches in the apical cluster instead of forming drooping branches or divergent branches, develop more vigorously than the others and continues the growth upwards. This long upright branch has all the characteristics of main axis. It is called innovation. Due to progressive death and decay of the parent plant these innovation become separated from the parent plant and establish themselves as parent plants.

6. By primary protonema.

In *Funaria* the primary protonema (the filament like structure) are produced with the result of the germination of the spore. The protonema may break into small pieces; and each such fragment is capable to grow into a new protonema. The protonema bears many buds. Each bud develops into a new plant(Fig 1.H).

7. By Secondary Protonema:

The protonema formed by other methods than from the germination of spores is called secondary protonema. It may develop from leaf, stem, rhizome, injured portion of the leafy gametophore, antheridium, paraphysis or archegonium. From this arise the leafy gametophores or lateral buds in the same manner as in primary protonema e.g., *Funaria*, *Sphagnum* (Fig 1. I).

8. By bulbils.

These are small resting buds develop on rhizoids. Bulbils are devoid of chlorophyll but full of starch. On germination bulbils produce a protonema which bears leafy gametophores (Fig. 1.I).

9. By cladia.

These are the small or broad detachable branches which help in vegetative reproduction. These are of two types- when cladia is arising from the individual cell of the leaf is known as leaf cladia e.g., *Plagiochila*, *Frullania* etc. Stem cladia arise from the stem and occupy the same position as sexual branches e.g., *Bryopteris*.

10. By persistent apices.

The adventitious branches develop from the ventral surface the thallus e.g., *Riccia fluitans*, (Cavers 1904) *Anthoceros*. On being detached from the parent plant these branches develop into new thalli. In *Marchantia*, *Dumortiera* these branches develop from archegoniophore while in *Pellia* these branches arise from the dorsal surface or margins of the thallus.