REGENARATION IN BRYOPHYTES

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INTRODUCTION

Bryophytes may reproduce both sexually and vegetatively. 1.Sexual reproduction involves the mixing of the genes of two parents, with the potential to produce new plants that differ, genetically, from each parent.

2.In vegetative reproduction, there is no such mixing and each new plant is derived from just one parent plant.

Regeneration is asexual **reproduction** is the ability of a simple organism to re-grow its lost parts. Simple organisms are more successful with **regeneration** than

Vegetative/Regeneration Reproduction in Bryophytes:

Bryophytes posses a characteristic feature and that is their tendency towards extensive vegetative reproduction.

The vegetative reproduction takes place in favourable season for vegetative growth. Majority of the Bryophytes propagate vegetatively and it is brought about in many

REGENERATION CARRIED OUT BY FOLLOWING WAYS

1. death and decay of the older portion of the thallus or fragmentation.
2. persistent apices.
3. tubers. 4. gemmae. 5. adventitious branches.
6. Regeneration. 7. innovation.
8. primary protonema.
9. secondary protonema. 10. bulbils.
11. apospory. 12. cladia.
13. separation of whole shoots. 14. separation of shoot tips.15. rhizoidal tips.

By Death and Decay of the Older Portion of Thallus or by Fragmentation:

In Bryophytes the growing point is situated at the tip of the thallus. The basal, posterior or older portion of the thallus starts rotting or disintegrating due to ageing or drought. When this process of disintegration or decay reaches up to the place of dichotomy, the lobes of the thallus get separated. These detached lobes or fragments develop into independent plants by apical growth. This is the most common method of vegetative reproduction in Riccia, Marchantia, Anthoceros and some mosses like Sphagnum (Fig. 1 A-C).

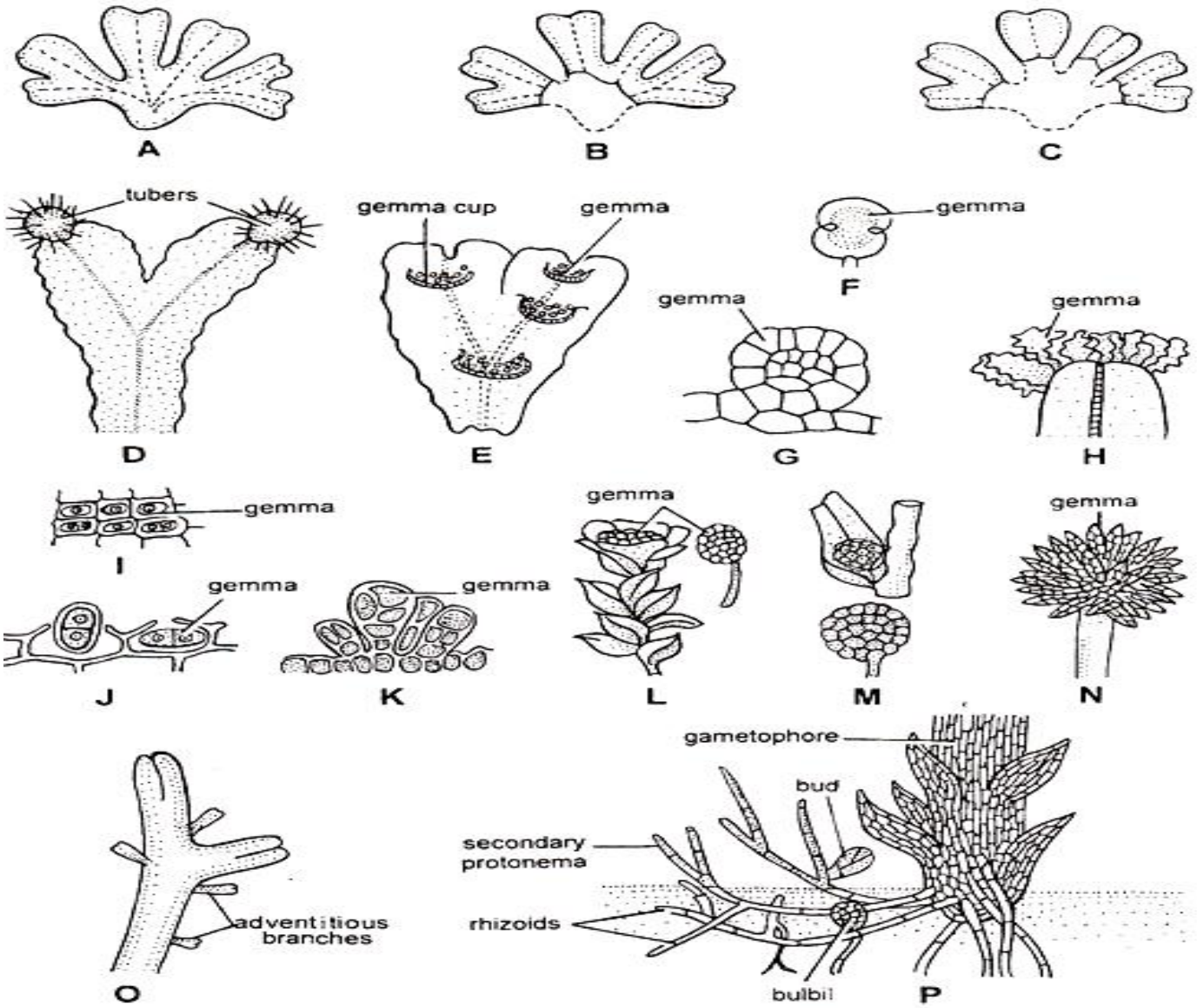

Fig. 1. (A–P). Vegetative reproduction in Bryophytes.

2. By Persistent Apices:

Due to prolonged dry or summer or towards the end of growing season the whole thallus in some Bryophytes (e.g., Riccia, Anthoceros, Cyathodium) dries and get destroyed except the growing point. Later, it grows deep into the soil and becomes thick. Under favourable conditions it develops into a new thallus.

3. By Tubers:

Tubers are formed in those species which are exposed to dessication (drying effect of the air). Towards the end of the growing season, the subterranean branches get swollen at their tips to from 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. On the return of the favourable conditions each tuber germinates to form a new plant e.g., Riccia, Anthoceros, Conocephalum,

4. 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

5. By Adventitious Branches:

The adventitious branches develop from the ventral surface the thallus e.g., Riccia fluitans, 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 (Fig. 1.0).

6. By Regeneration:

The liverworts possess an amazing power of regeneration. Part of the plant or any living cell of the thallus (e.g., rhizoid, scales).are capable of regenerating the entire plant f e.g., Riccia, Marchantia etc.

7. 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.

8. By Primary Protonema:

Primary protonema is the filament like stage produced by the developing spores of the mosses. It produces the leafy gametophores. It breaks into short filament of cells by the death of cells at intervals. Each detached fragment grows into a new protonema which bears a crown of leafy gametophores e.g., Funaria.

9. By Secondary Protonema:

The protonema formed by other methods than from the germination of spores is called secondary protonema. It may develop from any living cells of the leafy gainetophore i.e., from leaf, stem, rhizome, injured portion of

10. 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 P).

11. By Apospory:

The production of diploid gametophyte from the unspecialized sporophyte without meiosis is known as apospory e.g., Anthoceros. In Funaria green protonemal filaments may arise from the

12. By Cladia:

These are the small or broad detachable branches which help in vegetative reproduction. These are of two types:

(i) Leaf cladia:

Arising from the individual cell of the leaf e.g., Plagiochila, Bazzania, Frullania fragilifolia etc.

(ii) Stem cladia:

These cladia arise from the stem and occupy the same position as sexual branches e.g., Bryopteris.

13. By Separation of Whole Shoots:

A number of catkins like deciduous branches develop over the entire surface of the gametophytic plant. On separation these branches develop into new plant e.g., Pohlia nutans.

14. By Separation of Shoot Tips:

It occurs in Campylopus piriformis. The separated shoot tips develop into new plant.

15. By Rhizoidal Tips:

The apical part of the young rhizoids divide and re-divide to form a gemma like mass of cells e.g., Riccia glauca. These cells contain chloroplast and are capable

Methods of Perennation:

Perennation is the survival from season to season, generally with a period of reduced activity between each season.

The chief methods of perennation are:

1. By persistent apices.
2. By tubers.
3. By bulbils.

The spore and gemmae can also perennate and in some, instances even the protonema does. The perennial


Thank you