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December 04, 2019

Subject: Thank you for contributing in developing BBYCT-131 & BBYCL-132 courses – reg.

Dear Dr Pooja Gokhale Sinha,

Greetings from IGNOU! Thank you for your contributions in developing the above-mentioned Core Course Botany Paper 1 – Biodiversity (Microbes, Algae, Fungi and Archegoniates) which is a part of B.Sc. UGC CBCS programme being offered by IGNOU from July 2019 Session. The printed blocks are enclosed herewith for your kind perusal and reference. We remain grateful to you for giving your valuable time and sharing your rich experience in the development of these courses.

Thank you once again and we shall look forward to work with you in future for the various endeavours of the University.

Best regards.

Yours sincerely

Jaswant Sokhi

Jaswant Sokhi

To,

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BBYCT - 131
BIODIVERSITY (MICROBES, ALGAE, FUNGI AND ARCHEGONIATES)

BRYOPHYTES

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BIODIVERSITY (MICROBES, ALGAE, FUNGI AND ARCHEGONIATES)

Block

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BRYOPHYTES

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UNIT 12

INTRODUCTION TO ARCHEGONIATES

Structure

12.1 INTRODUCTION

You have already learnt that R.H. Whittaker placed bryophytes, pteridophytes, gymnosperms and angiosperms, all together in the Kingdom Plantae. All of them are eukaryotic, autotrophic, multicellular and are primarily land plants. Among them, angiosperms (the flowering plants) are characterized by double fertilization and resultant endosperm development. Together with gymnosperms they are called seed plants (spermatophytes). However, the seeds of an angiosperm are enclosed within a fruit, while those of gymnosperms are naked and exposed. These seed plants together with pteridophytes constitute vascular plants due to the occurrence of vascular tissue - the xylem and phloem in their various organs. They also biosynthesise lignin and produce true roots, stems and leaves. The bryophytes though mostly terrestrial, are non-vascular and without true roots, stems and leaves. They possess root-like rhizoids and may have 'stem' (cauloid) and 'leaves' (phyllids).

Double Fertilization: plants with two fertilizations in their sexual reproductive cycle.

Syngamy: fusion of a male and a female gamete.

Triple fusion: fusion of a male gamete and two polar nuclei in the central cell of an embryo-sac.

An important characteristic reproductive feature that distinguishes these land plants from the earlier, more primitive and possible ancestral algal groups, is the presence of multi-cellular sex-organs with sterile coverings. You may recall, none of the thallophytes (algae and fungi taken together) form a sterile cover around their sex-organs, which often are unicellular. A very specialized female sex organ, the archegonium is present in bryophytes, pteridophytes and gymnosperms. Plant morphologists have credited the **archegonium** with

Archegonium:

Greek="ápxn" (beginning) + "róoc" (offspring)

UNIT 13

BRYOPHYTES : AN INTRODUCTION

Structure

13.1 INTRODUCTION

Bryophytes are most abundant in moist, temperate and tropical areas along the edges of streams and wetlands. Some of them even inhabit deserts or on dry exposed rocks. Mosses are found to be dominant vegetation on rocky slopes above the timber-line in mountains. Bryophytes can withstand severe cold of Antarctic continents. A few of them are aquatic or even grow on rocks that are splashed by oceanic waves. None of them, however, are truly marine.

Bryophytes represent the most primitive land plants. They exhibit a sharply defined heteromorphic alternation of generations. Asexual sporophytic phase is associated with the sexual phase of gametophyte. The gametophytes are nutritionally independent and dominant of the two phases. Bryophytes require and are dependent on external water as medium for transfer of male gametes.

Majority views suggest that bryophytes arose from algae and probably from some green algae. The probable ancestry is suggestive of their origin from some of green algae viz. member(s) of family Chaetophoraceae, Cladophoraceae, and Ulvaceae. However, there are dismal fossil records to substantiate such arguments.

Recall Section 12.3 of the preceding unit which provides us valuable insights into strategies adopted by plants to invade, establish and flourish on land

UNIT 14

BRYOPHYTES: TYPE STUDIES

Structure

14.1 INTRODUCTION

In the previous unit you have learnt the general characteristics and classification of a group of plants, the bryophytes. If you may recall, some of the striking characteristics of this earliest group of land plants are: heteromorphic alternation of generations; dominant and photosynthetic gamete-producing haploid, gametophytic generation; multicellular sex-organs, the female archegonia and the male antheridia; sex-organs possess sterile cover of cells; haploid egg cell and diploid zygote are retained within the archegonium that is physically and physiologically in contact with the rest of the gametophyte; totally dependent sporophytic generation on the gametophyte for anchor and totally or partially dependent for water, minerals and nourishment (exhibits matrotrophy); certain cells/ tissues are modified to help absorb, transport water, mineral and foods, typical vasculature is absent; as adaptations to prevent water-loss, the aerial portions of the plants develop cuticle, and epidermis (sometimes with pores).

You have also been introduced to the classification of bryophytes as liverworts, hornworts and mosses. In this unit, you shall study the range of organization in bryophytes as well as morphological, anatomical and reproductive characteristics of a liverwort - *Marcharita*, and a moss - *Funaria*.

UNIT 15

BRYOPHYTES: ECOLOGY AND ECONOMIC IMPORTANCE

Structure

15.1 INTRODUCTION

In Units 12, 13 and 14 of this block you have learnt that bryophytes are small, non-vascular, green plants. You have also learnt that they exhibit distinct heteromorphic alternation of generations. Studies on the distribution, general characteristics and reproductive structures of bryophytes have helped plant biologists to understand the adaptations needed by plants to establish on land habitat and the relationship between the female sex-organ - archegonium and matrotrophy.

In this unit, you will study about the ecological role the bryophytes play in terrestrial habitats and their economic importance.