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SALIENT FEATURES OF PTERIDOPHYTES & THEIR ECONOMIC IMPORTANCE

Online class: 15/07/2020 (11:30 am - 1:10 pm)

PAPER-I (Group-B)

TDC Part-I
Bot(H)
(2019-22)

Salient Features:

(i) Pteridophytes represent vascular cryptogams well adapted to terrestrial habit.

(ii) Occupy a position intermediate between bryophytes and spermatophytes (seed plants).

(iii) A few forms are exceptionally aquatic, eg., Salvinia, Azolla, etc. (commonly called water ferns).

(iv) Mostly herbaceous; a few are tree-like (arborescent), e.g., Cyathea

(v) Main plant body is a sporophyte differentiated into root, stem and leaves (except Psilophytales and Psilotales which are rootless and leafless).

(vi) Roots generally adventitious, often in association with mycorrhiza (root inhabiting fungi)

(vii) Stem usually represented by rhizomes giving out aerial branches

(vii) Conducting tissues (xylem & phloem) well organized into different forms of steles

(viii) Microphylls (small sized leaves) may be ligulate or eligulate while megaphylls (large-sized leaves) show a distinct venation pattern.

(ix) Sporophyte produces haploid spores by meiosis within sac-like sporangia.

(x) Sporangia may be of two kinds: Eusporangia (developing from a group of initial cells) and Leptosporangia (developing from a single initial cell)

(xi) Based on the types of spores produced, pteridophytes may be homosporous (only one kind of spores) or heterosporous (two kinds of spores - microspores and megaspores)

(xii) Spores germinate to produce completely independent gametophytic plant body (Prothallus).

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(xiii) In homosporous pteridophytes, gametophytes are monoecious (antheridid & archegonia borne by the same plant) and exosporic (not enclosed within spore wall).

(xiv) In heterosporous pteridophytes, gametophytes are dioecious (microspores producing male gametophytes bearing antheridia and megaspores producing female gametophytes bearing archegonia) and endosporic (enclosed within the spore wall).

(xv) Antheridia produce flagellate antherozoids while archegonia produce an egg plus the neck canal cell and ventral canal cell.

(xvi) Fertilization occurs in presence of water resulting in the formation of zygote.

(xvii) Zygote develops into the sporophyte of the next generation.

(xviii) Regular alternation of sporophytic and gametophytic generations is a common feature of the life cycle.

(xix) Apogamy (development of a sporophyte directly from the gametophyte without fertilization) and apospory (development of the gametophyte directly from the vegetative parts of the sporophyte without intervening meiosis) have also been reported in some members.

Examples: Apogamy – Pteris cretica (Farlow, 1874)
Apospory – Athyrium filix-foemia (Druery, 1884)

(xx) Sporne (1959, 1974) classified Pteridophytes into five divisions/classes: Psilophytopsida, Psilotopsida, Lycopsida, Sphenopsida and Pteropsida.
– Other modern workers recognize only four divisions: Psilophyta, Lycophyta, Arthrophyta and Filicophyta.

Economic Importance:

(i) Used in horticulture, eg., Selaginella, Ruhmora adiantiformis (Florist's fern)

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(ii) Some ferns used in handicrafts, e.g., Petioles of some ferns used for making baskets and bracelets

(iii) Pteridium leaves used to produced a green dye

(iv) Club mosses used to produce a dry industrial lubricant

(v) Also used as a fodder for animals

(vi) Lycopodium and several ferns used in manufacturing allopathic or herbal medicines

(vii) Azolla used as a biofertilizer

(viii) Many pteridophytes are used as indicaters of the occurrence of minerals in the soil, thus helpful in geoprospecting.

(ix) Dryopteris is a good source of Potash, when burnt to ashes.

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