YAKEEN NEET 2.0

2026

Plant Kingdom

Botany | Lecture – 05

Rupesh Chaudhary Sir

Topics to be covered

1. Pteridophyte
2.
3.
4.

Bryophytes

(A) include liverworts not mosses

(B) grow in moist shady, humid place but not in damp region

(C) cannot live in soil

(D) depend upon water for fertilisation so called amphibians of plant kingdom

Bryophytes

(A) role in plant succession on rock

(B) body is less differentiated than algae

(C) always have unicellular rhizoid & multi.

(D) lack true root, stem, leaf

(E) (A) & (D) are correct

Bryophytes

(A) main body is haploid, sporophyte

(B) main body is gametophyte, diploid

(C) sporophyte and gametophyte are unicellular

(D) gametophyte produce gametes

Bryophytes

(A) sex organ : ~~unicellular~~ multi

(B) male gamete is ~~uniflagellated~~ Bi

(C) ~~female~~ male sex organ is antheridum

(D) female sex organ is flask shape

Bryophyte

(A) zygote undergoes meiosis immediately
(B) zygote produce unicellular body sporophyte
(C) sporophyte attached to gametophyte for food
(D) some cell of gametophyte undergoes meiosis to produce spore

Bryophyte

(A) more economic importance
(B) some mosses food for mammals birds, animals
(C) sargassum is peat moss
(D) sphagnum used in packaging of material
(E) sargassum hold water
(F) (B) & (D) are correct

Bryophytes

(A) moss along with lichen first organism to colonise on rock
(B) it is economic importance
(C) moss form loose mat on soil
(D) moss reduced impact of rain on soil so promote soil erosion

Liverworts

(A) marchantia is monoecious
(B) leafy members have tiny leaf like appendages in two rows on true stem
(C) asexual reproductive by Gemma
(D) Gemma are green, unicellular, asexual bud formed in Gemma cup

Liverworts

(A) sex organ always present on different thallus / Same tha.

(B) sporophyte is divided into foot seta capsule (haploid) 2n.

(C) spire germinate to form unicellular free living gametophyte
multic.

(D) none

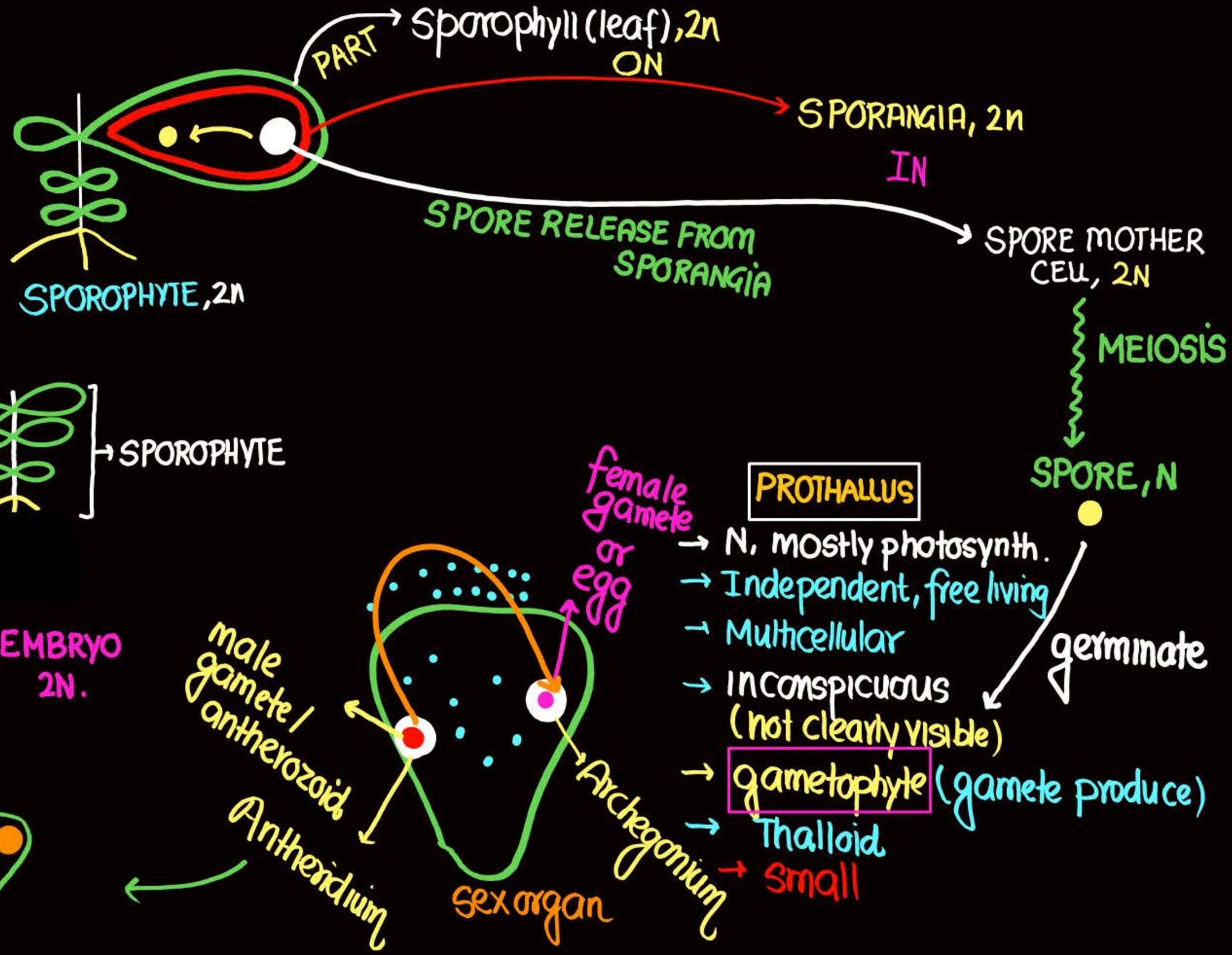
Cell cycle : Question
थोड़े से Discuss

Recorded

Backlog

LIFE CYCLE OF Homosporus Pteridophyte

* gametophyte : Need ✓ cool, damp, shady place so Restricted to narrow geographical Region (limited distribution)
* ★ Male gamete enter into archegonia
* ✓ Need H_2O For fertilisation



Steps

1. formation of sporophyte
2. sporophyll/leaf is a part of sporophyte
3. formtⁿ of sporangia on sporophyll of sporophyte
4. formtⁿ of SMC
5. SMC undergoes meiosis
6. spore formed
7. spore germinate to form prothallus
8. formtⁿ of sex organ on prothallus
9. formtⁿ of gametes in sex organ
10. male gamete Transfer into archegonium (needs H_2O)
11. fertilisation 12. zygote formation
13. embryo formtⁿ 14. sporophyte formtⁿ

Mostly Homosporus

Simple version

SPOROPHYTE (2N) → PART → SPOROPHYLL (2N)

SPOROPHYLL (2N) → ON → SPORANGIA 2N

SPOROPHYTIC GENⁿ

SPORANGIA 2N → IN → SPORE MOTHER CELL, 2N

SPORE MOTHER CELL, 2N → Meiosis → SPORE, N

SPORE, N → germinate → PROTHALLUS/ gametophyte N

PROTHALLUS/ gametophyte N → Anthendium → malegamete N

PROTHALLUS/ gametophyte N → archegonium → femalegamete N

malegamete N + femalegamete N → ZYGOTE (2N) → EMBRYO, 2N → SPOROPHYTE (2N)

Haplodiplontic Life cycle.

Gametophytic Genⁿ

One Type of spore.

★ Both gametophyte & sporophyte: Independent.

★ Necessary condition for seed formation:

① Plant: hetrosporus

② ?

precurser to seed habit

All Bryophyte & most of Pteridophyte: homosporus. : No seed.

But

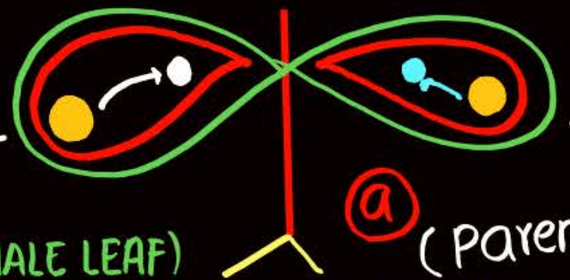
some pteridophyte are hetrosporus.

→ Selaginella
→ Salvinia
→ Azolla
→ marsilea

→ But still seed NOT FORMED.

Why ?

LIFE CYCLE OF HETROSPORUS PTERIDOPHYTE



SPOROPHYTE(2N) ⓐ (parent)

2n MICROSPORANGIA → IN

2n MICROSPORE MOTHER CELL ⓑ → Meiosis

N MICROSPORE → FORM

N MALE GAMETOPHYTE → PRODUCE

N MALE GAMETE

(small) Malespore

Zygote (2n) ← Fertilisation ← enter into female gametophyte

MEGA SPOROPHYLL (FEMALE LEAF) 2n → ON

MEGASPORANGIA 2n → IN

MEGASPORE MOTHER CELL, 2n. → MEIOSIS

MEGASPORE, N. → femalespore, large → Form

Female gametophyte, N → IN

FEMALE GAMETE, N

ZYGOTE, 2N

EMBRYO 2N.

female gametophyte seperated from sporophyte

★ zygote develop into embryo in female gametophyte.

✓ female gametophyte on sporophyte for variable period. (Temporary)

3.3 PTERIDOPHYTES

The Pteridophytes include horsetails and ferns. Pteridophytes are used for medicinal purposes and as soil-binders. They are also frequently grown as ornamentals. Evolutionarily, they are the first terrestrial plants to possess vascular tissues – xylem and phloem. You shall study more about these tissues in Chapter 6. The pteridophytes are found in cool, damp, shady places though some may flourish well in sandy-soil conditions.

You may recall that in bryophytes the dominant phase in the life cycle is the gametophytic plant body. However, in pteridophytes, the main plant body is a sporophyte which is differentiated into true root, stem and leaves (Figure 3.3).

These organs possess well-differentiated vascular tissues. The leaves in pteridophyta are small (microphylls) as in *Selaginella* or large (macrophylls) as in ferns. The sporophytes bear sporangia that are subtended by leaf-like appendages called **sporophylls**.

X, P

sporophyll

sporangia

In some cases sporophylls may form distinct compact structures called strobili or cones (*Selaginella, Equisetum*). The sporangia produce spores by meiosis in spore mother cells. The spores germinate to give rise to inconspicuous, small but multicellular, free-living, mostly photosynthetic thalloid gametophytes called **prothallus**.

These gametophytes require cool, damp, shady places to grow. Because of this specific restricted requirement and the need for water for fertilisation, the spread of living pteridophytes is limited and restricted to narrow geographical regions. The gametophytes bear male and female sex organs called antheridia and archegonia, respectively.

PROTHALLUS.

Water is required for transfer of antherozoids – the male gametes released from the antheridia, to the mouth of archegonium. Fusion of male gamete with the egg present in the archegonium result in the formation of zygote.

Zygote thereafter produces a multicellular well-differentiated sporophyte which is the dominant phase of the pteridophytes. In majority of the pteridophytes all the spores are of similar kinds; such plants are called **homosporous**.

Genera like *Selaginella* and *Salvinia* which produce two kinds of spores, macro (large) and micro (small) spores, are known as **heterosporous**. The megaspores and microspores germinate and give rise to female and male gametophytes, respectively.

The female gametophytes in these plants are retained on the parent sporophytes for variable periods. The development of the zygotes into young embryos take place within the female gametophytes. This event is a precursor to the **seed habit** considered an important step in evolution.

The pteridophytes are further classified into four classes: Psilopsida (*Psilotum*); Lycopsida (*Selaginella*, *Lycopodium*), Sphenopsida (*Equisetum*) and Pteropsida (*Dryopteris*, *Pteris*, *Adiantum*).

Salvinia, marsilea, azolla (smallest)

HW

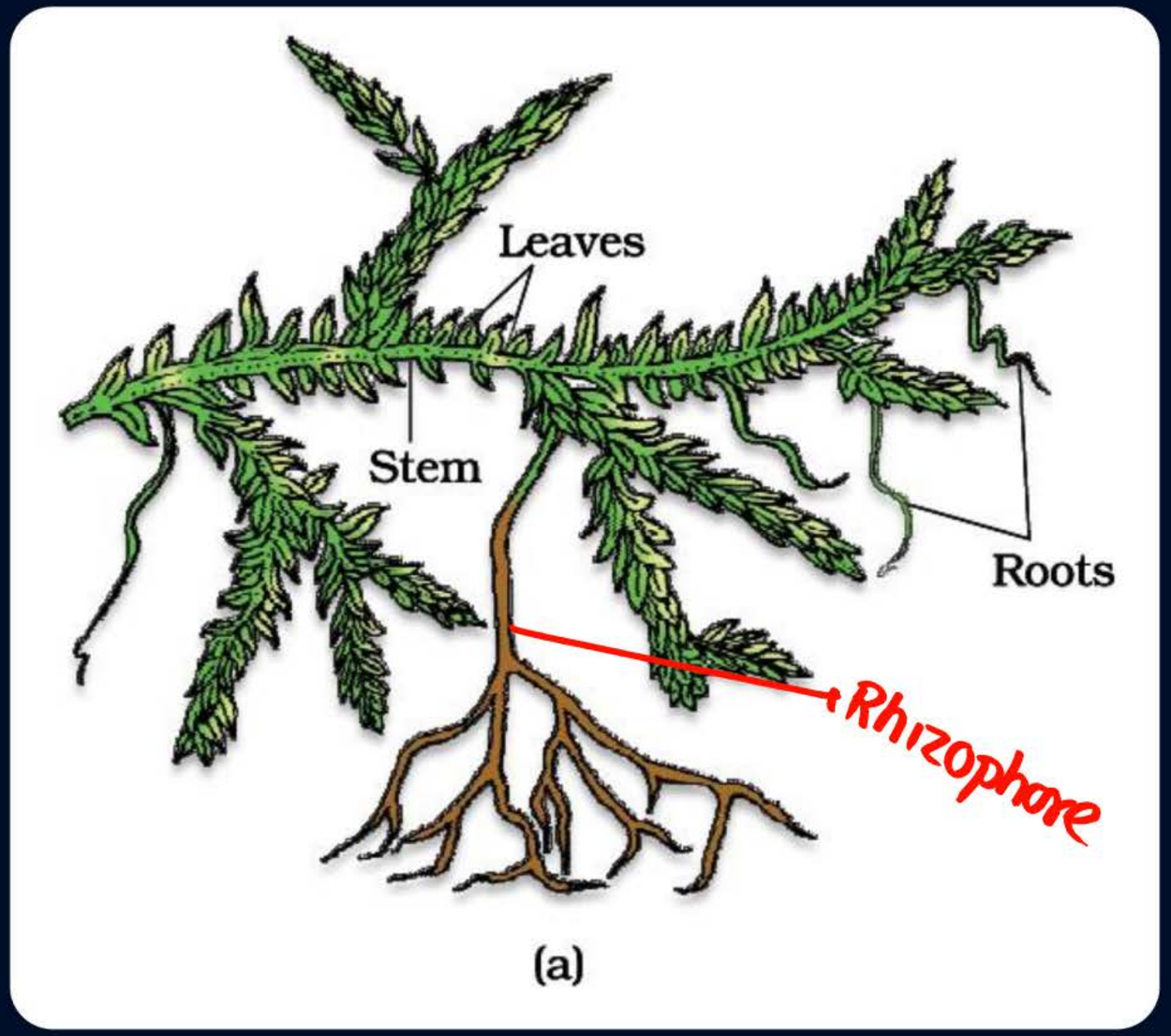
leaf

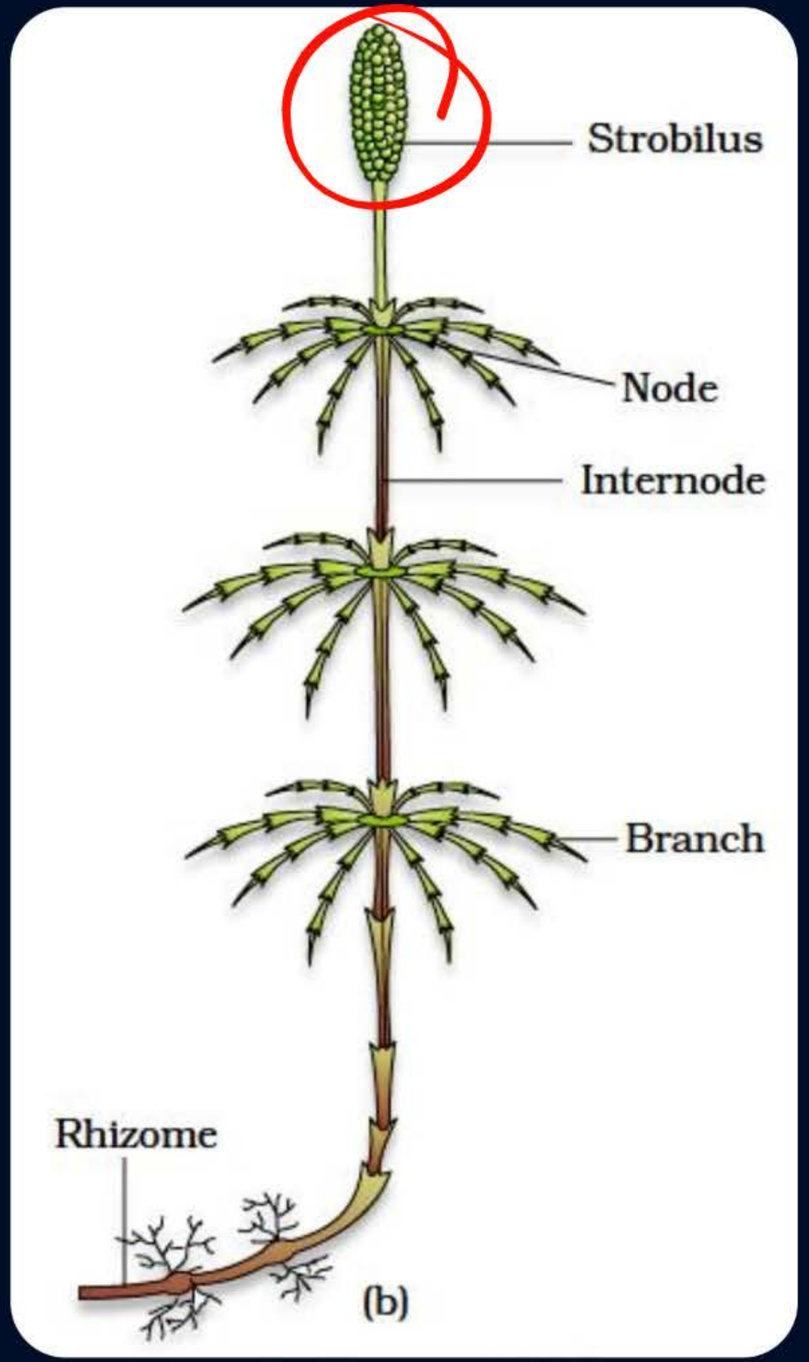
Anabaena (BGA) (N_2 Fixtn.

(maiden hair fern)

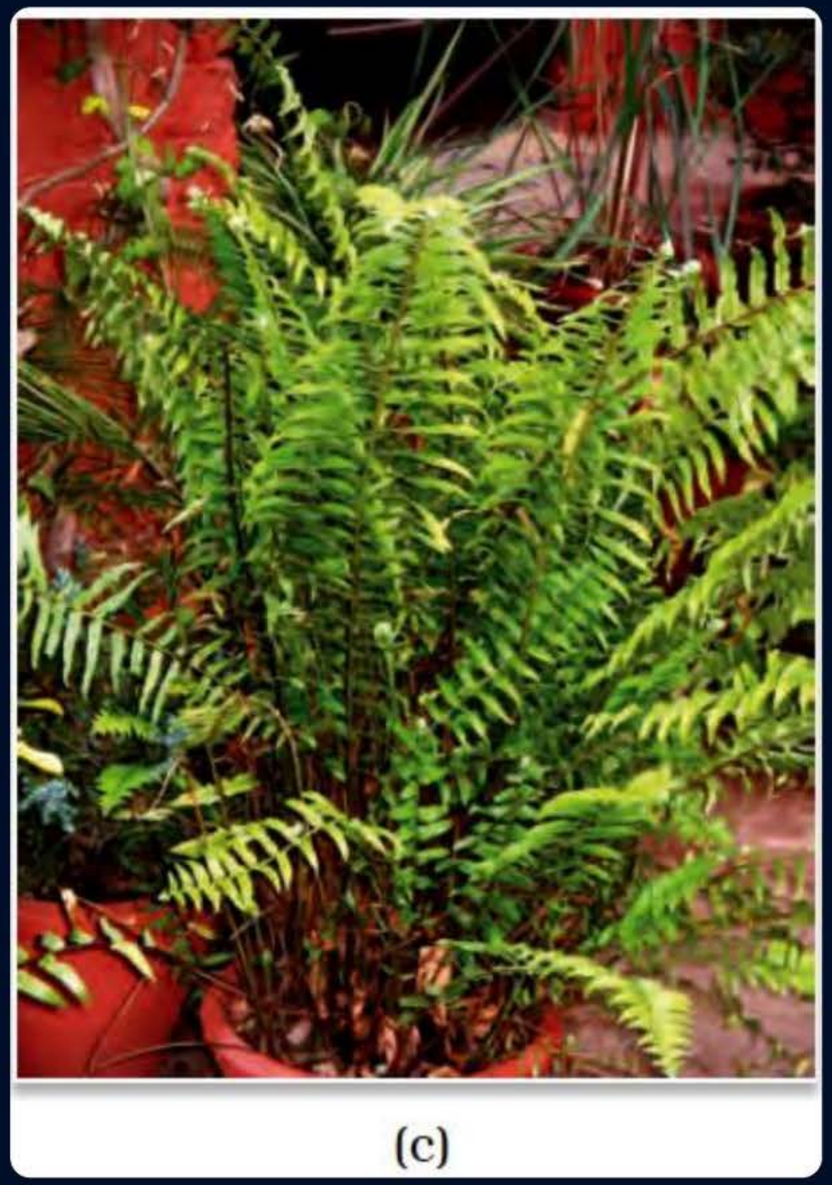
primitive class.

Ophioglossum (max numb of chromosome 2n: 1260.





Pteridophytes :
(a) *Selaginella* (b) *Equisetum*



(c)

(d)

Pteridophytes :
(c) *Fern* (d) *Salvinia*

Mosses

(A) predominant stage is gametophyte
(B) first stage is leafy and second is protonema
(C) leafy stage develop from primary protonema as a lateral bud
(D) leafy stage consist of upright slender axis bear spirally arranged leaves

Mosses

(A) Rhizoids : multicellular unbranched with oblique septa
(B) protonema stage bear sex organ
(C) antheridia and archegonia at the apex of leafy shoot
(D) vegetative reproduction by fragmentation and budding in primary protonema

Mosses

(A) zygote develop into foot sets capsule, haploid structure
(B) sporophyte is less elaborate than liverworts
(C) spore formed after mitosis
(D) have elaborate mechanism of spore dispersal
(E) funaria, polysophonia, sphagnum

Pteridophyte

(A) soil binder
(B) ornamental
(C) medicinal
(D) all

Pteridophyte

(A) embryo absent

(B) vascular tissue present in gametophyte

(C) include horsetail (equisetum)

(D) dominant body is gametophyte

Correct

A. Small leaf in selaginella (macrophyll)

B. large leaf in ferns (microphyll)

C. Cones present in all Pteridophyte

D. sporophyll bear sporangia

E. sporophyll aggregate to form cone in selaginella only

F. sporangia produce spore by mitosis in spore mother cell

(A) 1 (B) 2 (C) 3 (D) 4

Correct

(A) prothallus : small, multicellular, conspicuous

(B) prothallus - mostly photosynthetic, thalloid gametophyte, free living, dependent

(C) gametophyte require cool damp shady place to grow so distribution is unlimited

(D) gametophyte bear antheridia and archegonia

Correct

(A) all Pteridophyte are homosporus
(B) mostly are homosporus
(C) zygote develop into unicellular sporophyte
(D) selaginella and salvinia are hetrosporus

Correct

(A) zygote develop into embryo in female gametophyte
(B) this event is precursor to seed habit
(C) it is important step in evolution
(D) female gametophyte retained on parent sporophyte for variable period
(E) microspore (large) & megaspore (small) form male and female gametophyte respectively
(F) All are correct except (E)

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Module :

Pteridophyte

Question

THANK YOU