

PTERIDOPHYTES

Johnson, M
 Assistant Professor in Botany,
 Director, Centre for Plant Biotechnology,
 St. Xavier's College (Autonomous),
 Palayamkottai – 627 002
 E-mail: ptcjohnson@gmail.com
 Mob: 9786924334

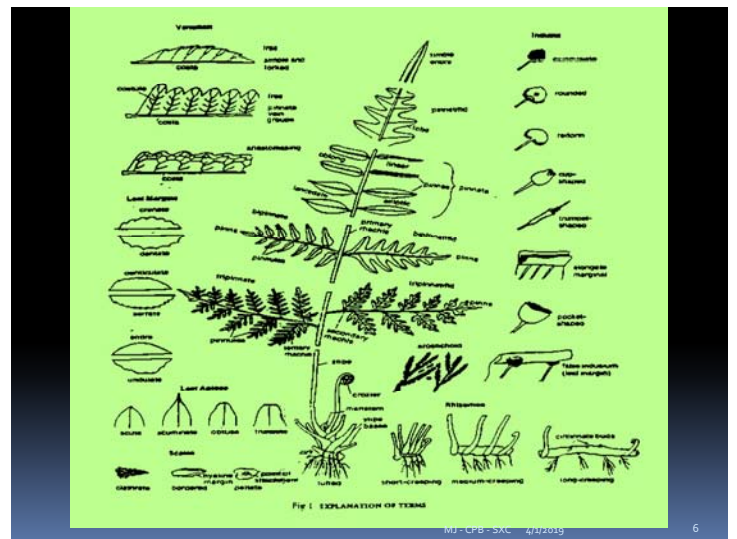
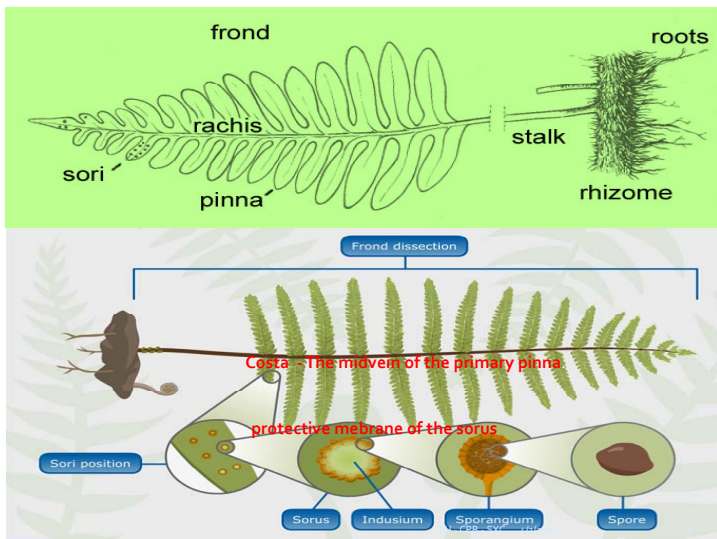
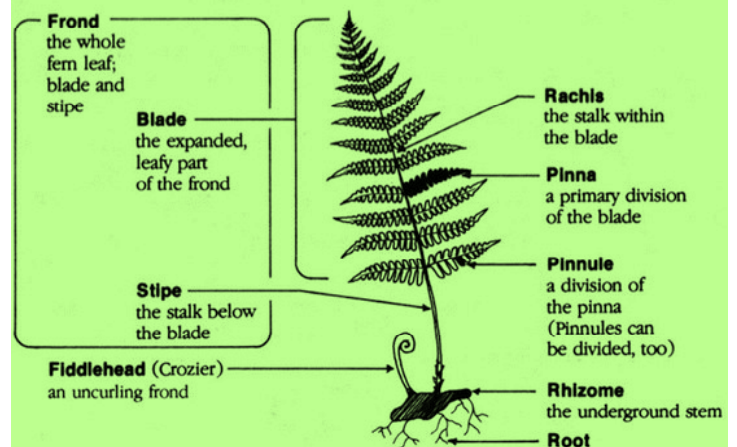
PTERIDOPHYTES

- Pteridophyta - Greek words
 - Pteris=Pteron = feather; and phyton - a plant – feather like plants.
- Pteridophytes - primitive tracheophytes
- Non-flowering vascular cryptogams with conducting tissues namely Xylem and Phloem.
- Produce definite embryos during the life cycle- not developed within definite seeds.
- seedless vascular plants or seedless embryophytes
- 400 genera and about 12000 species of pteridophytes.
- club-mosses, spike-mosses, horse-tails and ferns.

Pteridophytes

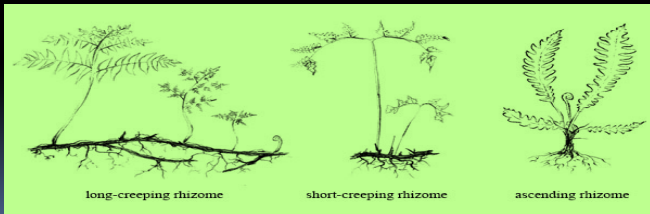
- Originated in the Silurian period and flourished in the Devonian period.
- Pteridophytes - Vascular Cryptogams – Cryptogams with vascular system.
- Pteridophytes show heteromorphic alternation of generation with prominent sporophytic and gametophytic phases.
- Main plant body of pteridophytes - sporophytic plant (Diploid).
- The gametophytic and sporophytic generations - two independent plants (not physically connected)

Parts of a fern ①



Rhizome

- Underground part of the fern
- Root arise directly on the rhizome - **adventitious roots**



MJ - CPB - SXC 4/1/2019

7

Habit and Habitat

- Pteridophytes show much variation in form, size and habitat.
- Most of the present day Pteridophytes - annual, terrestrial and herbaceous plants.
- Ex: *Psilotum*, *Selaginella*, *Lycopodium*



MJ - CPB - SXC 4/1/2019

8

Large perennial tree Ex: *Cyathea*, *Angiopteris*, *Alsophila*



MJ - CPB - SXC 4/1/2019

9

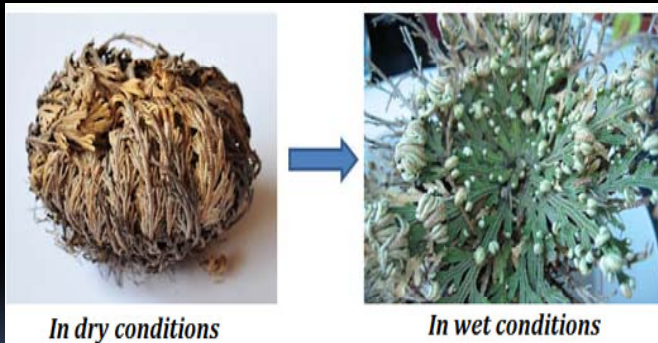
Aquatic Ex: *Marsilea*, *Salvinia*, *Azolla*, *Isoetes*



Salvinia

Isoetes

Xerophytes Ex: *Selaginella lepidophylla*, *Selaginella involvens*, *Selaginella wightii* (Resurrection Plants)



MJ - CPB - SXC 4/1/2019

11

Halophytes Ex: *Acrostichum*

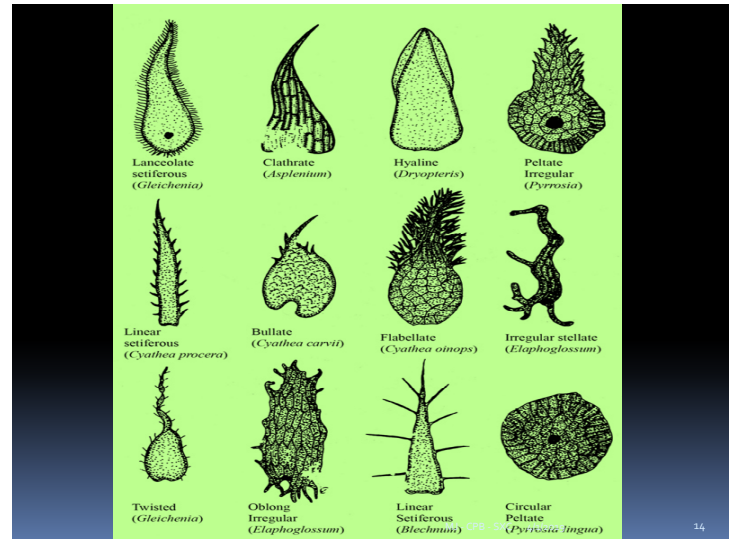


MJ - CPB - SXC 4/1/2019

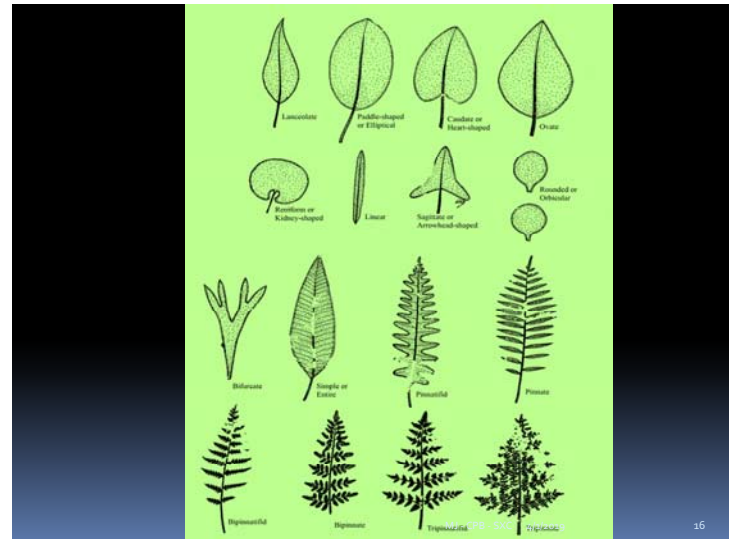
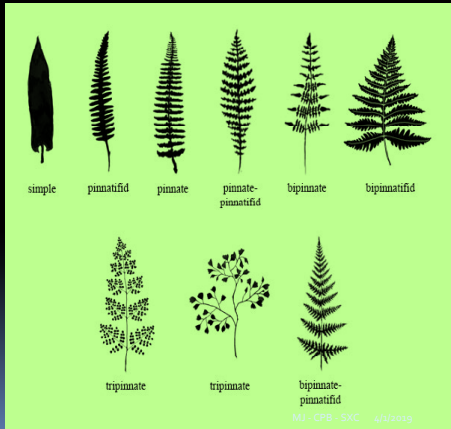
12

Habit:

- Herb - *Christella*
- Shrub - *Diplazium*
- Climber - *Lygodium*, *Selaginella*
- Tree - *Cyathea*

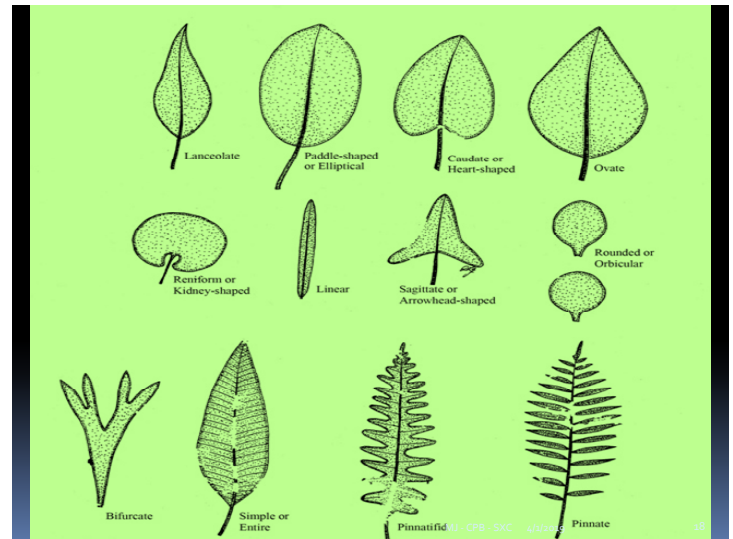


Lamina: simple / pinnate / bi pinnate / tripinnate / quadripinnate



Stipe

- Size, Shape - Terete / Grooved; Colour / Smooth - glabrous or with appendages (Scales or hairs)



Based on the size - Leaves

- Three types of leaves
 - Scale leaves – small minute scale – like leaf Ex: *Equisetum*
 - Small Sessile Leaves – leaves are small without leaf stack (petiole) Ex: *Lycopodium* and *Selaginella*
 - Large, Petiolate compound leaves – occurs in true ferns – Ex: *Pteris*, *Angiopteris*

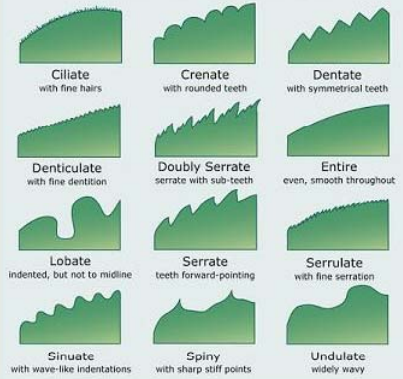


Scale Leaf
(*Equisetum*)

Sessile Leaf
(*Lycopodium*)

Petiolate Leaf
(*Adiantum*)

MARGIN



MJ - CPB - SXC 4/2/2019

20

In ferns, the young leaves show circinate vernation

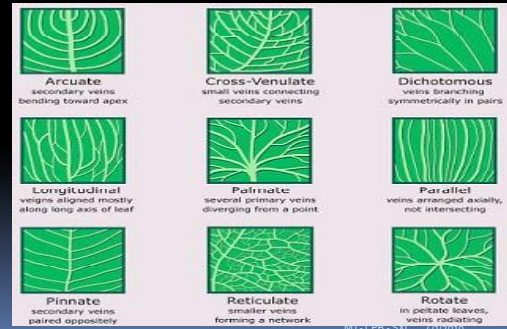


MJ - CPB - SXC 4/2/2019

21

Veins

- Distinct or not, raised/ not raised above or below; Venation: Simple, forked/ free / anastomosed with or without included veinlets in areoles



MJ - CPB - SXC 4/2/2019

22

Sporophyll: Monomorphic / Dimorphic



MJ - CPB - SXC 4/2/2019

23

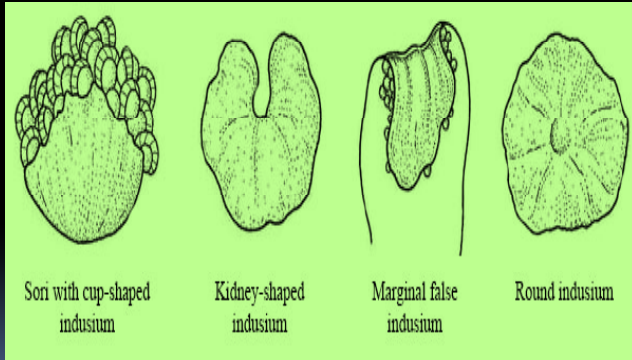
Position: Marginal / Submarginal / Superficial / Acrostichoid



MJ - CPB - SXC 4/2/2019

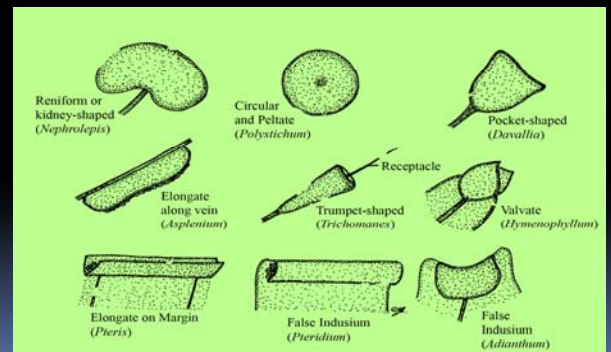
24

Indusium: Indusiate / Exindusiate

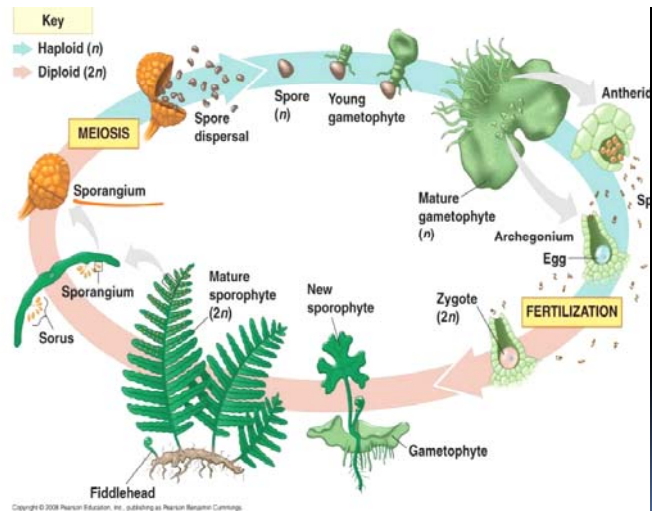
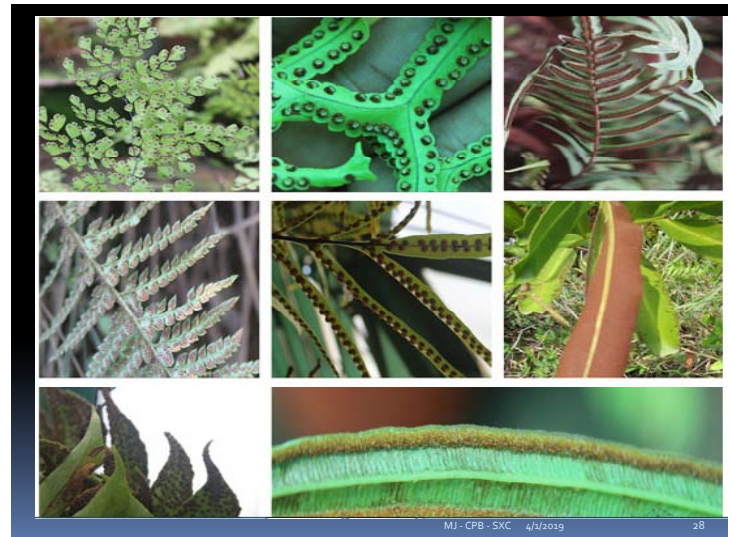
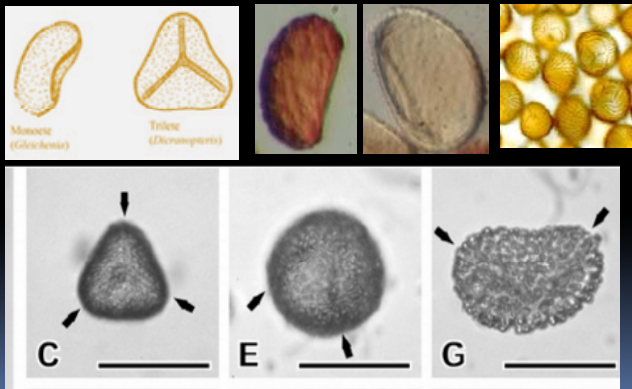


Shape

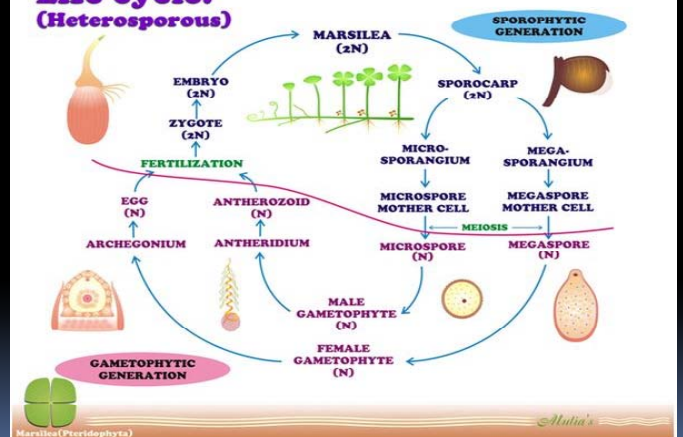
- Circular / reniform / linear / diplazoid / tubular / athyroid / horse shoe shaped



Spores: Monolete / trilete



Life-cycle: (Heterosporous)



Economic Importance

- Red dye – young stems of *Sphenomeris chinensis* - HAWAI
- Vegetable curry - tender fronds of *Dryopteris cochleata*, *D. sparsa* – Indian Tribals
- Food - Fresh fronds of *Ceratopteris thalictroides*, *Marsilea minuta*, *Tectaria caudunata* - with pulses and eaten -India
 - Pith of *Angiopteris evecta* – Arunachal Pradesh
- Ornamental - *Dryopteris*, *Adiantum*, *Nephrolepis*, *Pteris*
- Sanjiwani - *Selaginella bryopteris*
- Skin – *Lycopodium*
- Diuretic - Decoction of *Adiantum lunulatum*

MJ - CPB - 5XC 4/1/2019

31

- Stems of *Lygodium flexuosum* boiled with mustard oil - against rheumatism
- Fronds of *Pteris Spp.* are used to cure cuts and wounds
- Antioxidant, Anticancer, Antimicrobial, Anti-inflammatory, Cytotoxic – *Selaginella*, *Angiopteris*, *Marattia*, *Adiantum*, *Nephrolepis*, *Sphaerostephanos*, *Lygodium*, *Pteris*, *Cheilanthes*, *Polystichum*

MJ - CPB - 5XC 4/1/2019

32

Amazing Ecological Roles

- Provide microhabitats, as well as shelter and shade to small animals
- Provide a source of food or medicine for animals,
- Including people ceremonial and spiritual use or importance colonize disturbed sites as one stage in succession
- Filter toxins, such as heavy metals, from environments
- Bio-indicator for the health of an ecosystem
- Evolve to fill unique niches in ecosystems and co-evolve with other species.

MJ - CPB - 5XC 4/1/2019

33