GYMNOSPERMS

DEFINITION AND CHARACTERISTICS

What are Gymnosperms

- Gymnos=naked and sperma=seed
- That means the plants with naked seeds
- In other words it is a group of seed bearing plants whose ovules are not enclosed in an ovary, but are exposed on the surface of sporophylls or similar structures.

Examples of Gymnosperms

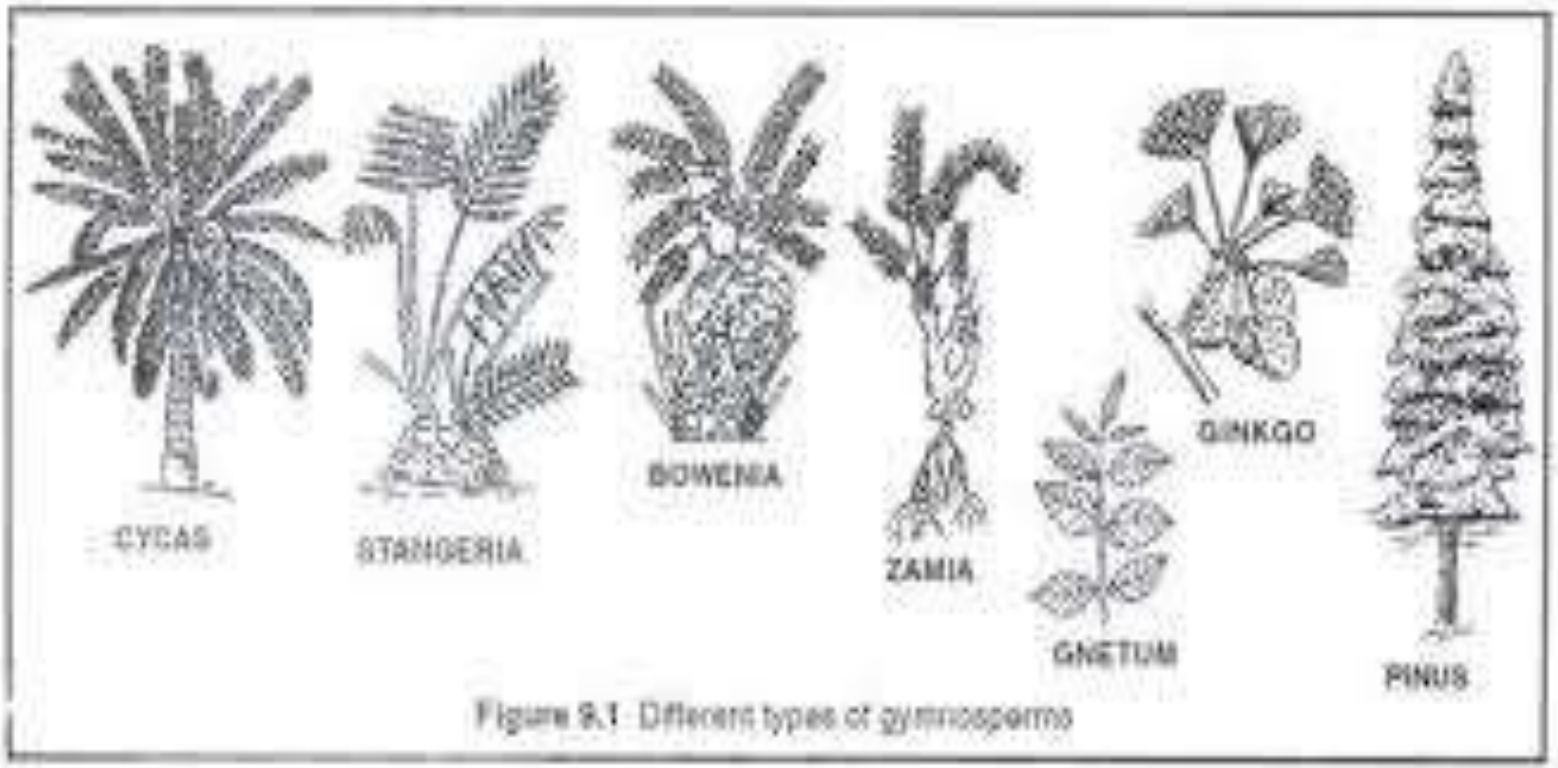

Figure 9.1 Different types of gymnosperms

Characteristics of Gymnosperms

- Gymnosperms produce cones.
- Gymnosperms do not bear fruits.
- Gymnosperms propagate via wind pollination.
- The adult plant body is a sporophyte. It is represented by a perennial, evergreen, woody plant. Most of them are trees and some are shrubs. There are no herbs.
- Pinus as well as other conifers are evergreen trees. They have monopodial growth represented by one main axis. As the axis grows taller it increases in diameter due to secondary growth. Stem branches are of two types:

1. Long shoots or branches of unlimited growth.
2. Dwarf shoots or branches of limited growth

Anatomical Characters

- In some gymnpsperms, the wood is monoxylic(e.g.Cycas)whereas in others it is pycnoxylic(e.g.Pinus)
- The vessels and wood fibres are absent in the xylem and the companion cells are absent in phloem.
- The roots have diarch or polyarch xylem in vascular cylinder.
- Secondary groeth occurs.
- Annual rings are distinct.

Reproductive Characters

- The plants are usually heterospore,i.e.two types of spores-male microspores and female megaspores.
- Microspores borne on microsporangia and megaspores borne in megasporangia.
- The development of eusporangiate type, i.e. sporangia develops from group of initial initial cells originating from hypodermis.
- Poolination is anemophilous.
- Fertilization occurs by siphonogamy.
- Zygote develops into embryo in situ.
- True fruits developed from ovary are not formed.

ECONOMIC IMPORTANCE OF GYMNOSPERMS

Economic importance of gymnosperms

- **As food**
- Seeds of some species are edible: Cycas, Ginko, Pinus, Gnetum
- The seeds and stems of cycas yield 'sago' which is a starch and is also called "arrow root".
- *Zamia* is a rich source of starch.
- Seeds and stem of *Cycas revoluta* u
- wine.
- young leaves of Cycas cooked as v

kaffir bread' prepared from the stem p

Encephalartos.

- **As medicine**
- Ephedrine(alkaloid) extracted from *Ephedra* used in treating asthma, cough, cold, bronchitis etc.
- Tincture of *Ephedra* is a cardiac stimulant.
- Anti cancerous drug called taxol, is obtained from the bark of *Taxus*.
- The juice is extracted from young leaves of *Cycas revoluta* is used for curing blood vomiting and flatulence.
- In Assam the pounded stem of *Cycas pectinata* is used as a hair wash for diseased hair roots.

- **In industry**

1. Gum- Cycas gum used as a adhesive, antidote for snake bites and using malignant ulcers.
2. Tannins- Tannins are used in leather industry and it is extracted from the bark of Araucaria, Sequoia etc.
3. Canada balsam- it is turpentine obtained from *Abies balsamea* and used as a mounting medium in biological preparations.
4. Amber- it is a fossil resin obtained from *Pinus succinifera*. Wood of pinus is used for doors, poles, beams, railway wagon flooring etc.
5. Plywood is prepared from *Podocarpus*.
6. Papers like newsprints, writing and printing papers are being prepared from the wood pulp of


Thank
you