Classification of Angiosperms

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Practical classification

➢ In this type of classification, plants are classified on the basis of their economic importance. In this type of classification morphology of plants in not considered.

Oil yielding plants - Coconut, Walnut, Soybean

Fibre yielding plants - Jute, Cotton

Medicinal plants - Rauwolfia, Cinchona,

Artificial classification

In this type of classification plants are classified on the basis of one or two morphological characters i.e. over all morphology is not considered.

for e.g. - Classification proposed by Linnaeus is Artificial

Linnaeus classified plant kingdom on the basis of only two characters.

(1) **Stamens** (2) **Style**

On the basis of stamens and style, Linnaeus classified plant kingdom in to 24 classes.

Natural classification

In natural system of classification plants are classified on the basis of their **complete morphology.** In it the classification of whole plant is included (stem, root, Leaves, flower etc.) Maximum characters are taken as base in this classification.

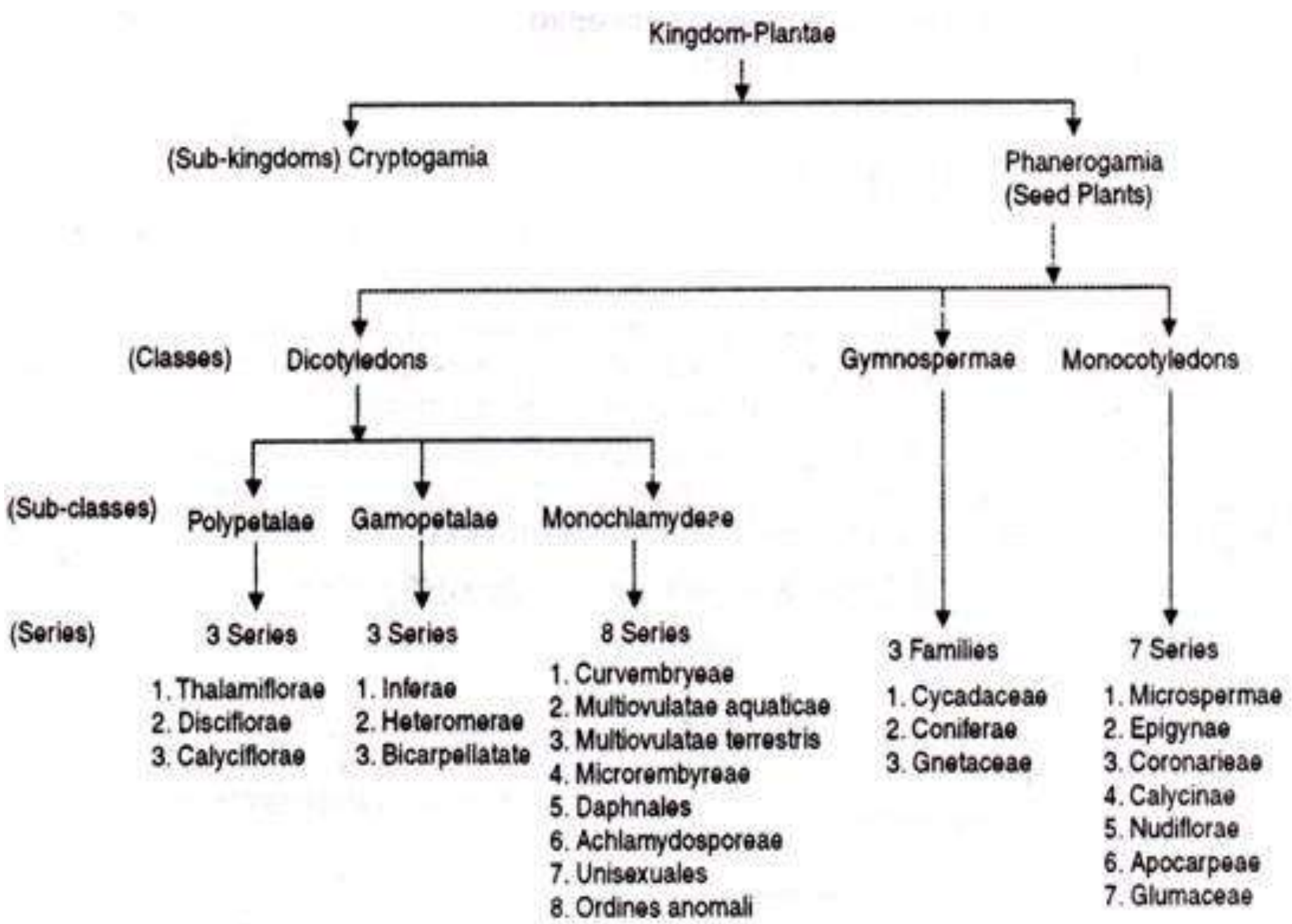
- Natural classification is believed to be the best classification, because it represents the natural similarities and dissimilarities of plants i.e. it represents the interrelationship among plants.

Phylogenetic classification

In this classification, both morphology and phylogeny are considered. In phylogentic classification, the plants are arranged on the basis of their evolution

BENTHAM AND HOOKER SYSTEM OF CLASSIFICATION

- Natural system of classification according to Bentham and Hooker
- This system includes the names and descriptions of all genera, of seed plants known so far and classified accordingly
- This system divided seed plants into 97,205 species under 202 families
- They divide seed plants into three classes in sequence. Dicotyledon, gymnosperm and monocotyledon
- Dicots divided into 3-divisions and 14 series on the basis of the natural and visual characteristic which provides key for identification
- Diocts started with family Ranunculaceae having free sepals and petals and indefinite number of stamens and carpels are free where as it ends with labiatae having fused sepals and petals with definite number of carpels and stamens
- Among monocots out of seven series with epigenous flower i.e. orchidaceous and scitaminal were kept first and second respectively followed by with petaloid hypogenous flowers and finally ended with Graminae and Cyperaceous


Kingdom-Plantae
(Sub-kingdoms) Cryptogamia
Phanerogamia
(Seed Plants)
(Classes)
Dicotyledons
Gymnospermae
Monocotyledons
(Sub-classes)
Polypetalae
Gamopetalae
Monochlamydeae
(Series)
3 Series
1. Thalamiflorae
2. Disciflorae
3. Calyciflorae
3 Series
1. Inferae
2. Heteromerae
3. Bicarpellatate
8 Series
1. Curvembryeae
2. Multiovulatae aquaticae
3. Multiovulatae terrestris
4. Microrembyreae
5. Daphnales
6. Achlamydosporeae
7. Unisexuales
8. Ordines anomali
3 Families
1. Cycadaceae
2. Coniferae
3. Gnetaceae
7 Series
1. Microspermae
2. Epigynae
3. Coronarieae
4. Calycinae
5. Nudiflorae
6. Apocarpeae
7. Glumaceae

Merits of Bentham and Hooker's System

- The classification of Bentham and Hooker was natural and simple
- The classification of Behtham and Hooker was mainly based on the floral characters. This was very appreciable because floral characters are more stable than vegetative (root, stem, leaves) characters
- This system is highly practical and is useful to students of systematic botany for easy identification of species.
- Dicots begin with the order Ranales which are now universally considered as to be the most primitive angiosperms.
- Placing of monocots after the dicot is again a natural one
- The placing of series disciflorae in between thalamiflorae and calyciflorae is quite natural.
- Arrangement of all plants in the botanical gardens and herbarium of the world is based on it The main reason is that this classification is based on actual observation

Demerits of Bentham and Hooker's System

- In this classification the phylogeny of plants is not considered, because in it, gymnosperms are placed in between dicots and monocots

The sequence of evolution is as follows

Gymnosperm ⟶ Dicots ⟶ Monocots

- Placing of monochlamydeae after gamopetalae does not seem to be natural.
- There were no phylogenetic considerations
- Certain families of monochlamydeae are closely related to families in polypetalae, e.g. Chenopodiaceae and Caryophyllaceae.
- Advanced families, such as Orchiadaceae have been considered primitive in this system by placing them in the beginning. Placing of Orchidaceae in the beginning of monocotyledons is unnatural as it is one of the most advanced families of monocots. Similarly, Compositae (Asteraceae) has been placed near the beginning of gamopetalae which is quite unnatural.
- Liliaceae and Amaryllidaceae were kept apart merely on the basis of characters of ovary though they are very closely related.

HUTCHINSON'S SYSTEM OF CLASSIFICATION

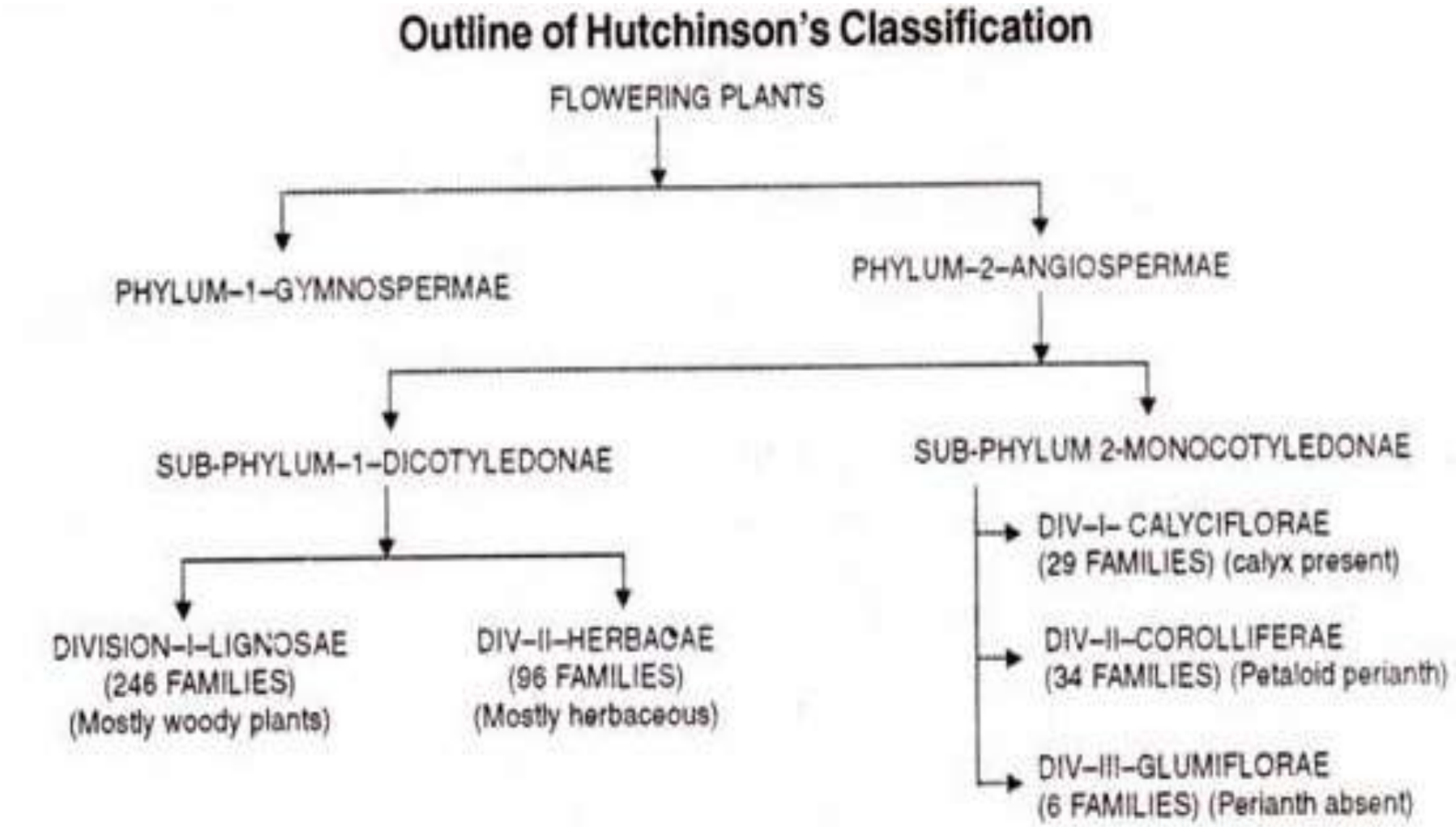
- John Hutchinson was a British botanist associated with Royal Botanic Gardens, Kew, England.
- He proposed his system of classification based on Bentham and Hooker and also on Bessey
- His phylogenetic system first appeared as "The Families of Flowering Plants" in two volumes

Hutchinson considered the following points to classify the flowering plants

- According to Hutchinson evolution takes place in both upward and downward direction.
- All organs do not evolve at the same time during evolution.
- Trees and shrubs are more primitive than herbs in a group like genus or family.
- Trees and shrubs are primitive than climbers
- Terrestrial angiosperms are primitive than aquatic angiosperms
- Dicotyledonous plants are primitive than monocotyledonous plants.

- Simple leaves are more primitive than compound leaves.
- Bisexual plants are primitive than unisexual plants and monoecious plants are primitive than dioecious plants
- Polypetalous flowers are more primitive than gamopetalous flowers
- Flowers with petals are more primitive than apetalous flowers
- Hypogyny is considered as more primitive from which perigyny and epigyny gradually evolved
- Actinomorphic flowers are more primitive than zygomorphic flowers
- Apocarpous gynoecium is more primitive than syncarpous
- Flowers with petals are more primitive than apetalous flowers
- Flowers with separate anthers are primitive than flowers with fused anthers
- Endospermic seeds with small embryo is primitive than non-endospermic one with a large embryo.

❖ John Hutchinson divided the Phylum Angiospermae into two Subphyla Dicotyledones and Monocotyledones



Merits of Hutchinson System of classification

- Hutchinson proposed the monophyletic origin of angiosperms from some hypothetical Proangiosperms having Bennettitalean characteristics
- Monocots have been derived from Dicots
- He made a valuable contribution in phylogenetic classification by his careful and critical studies

Demerits of Hutchinson System of classification

- The origin of angiosperms from Bennettitalean-like ancestor is criticised by many, because the anatomical structures of the early dicotyledons are not tenable with such ancestry
- Too much emphasis is laid on habit and habitat. Thus, creation of lignosae and herbaceae is thought to be a defect reflecting the Aristotelean view.

Thank You !!