B. N. College, Bhagalpur

(A Constituent unit of Tilka Manjhi Bhagalpur University.)

Department of Botany

Topic : Classification of Angiosperm

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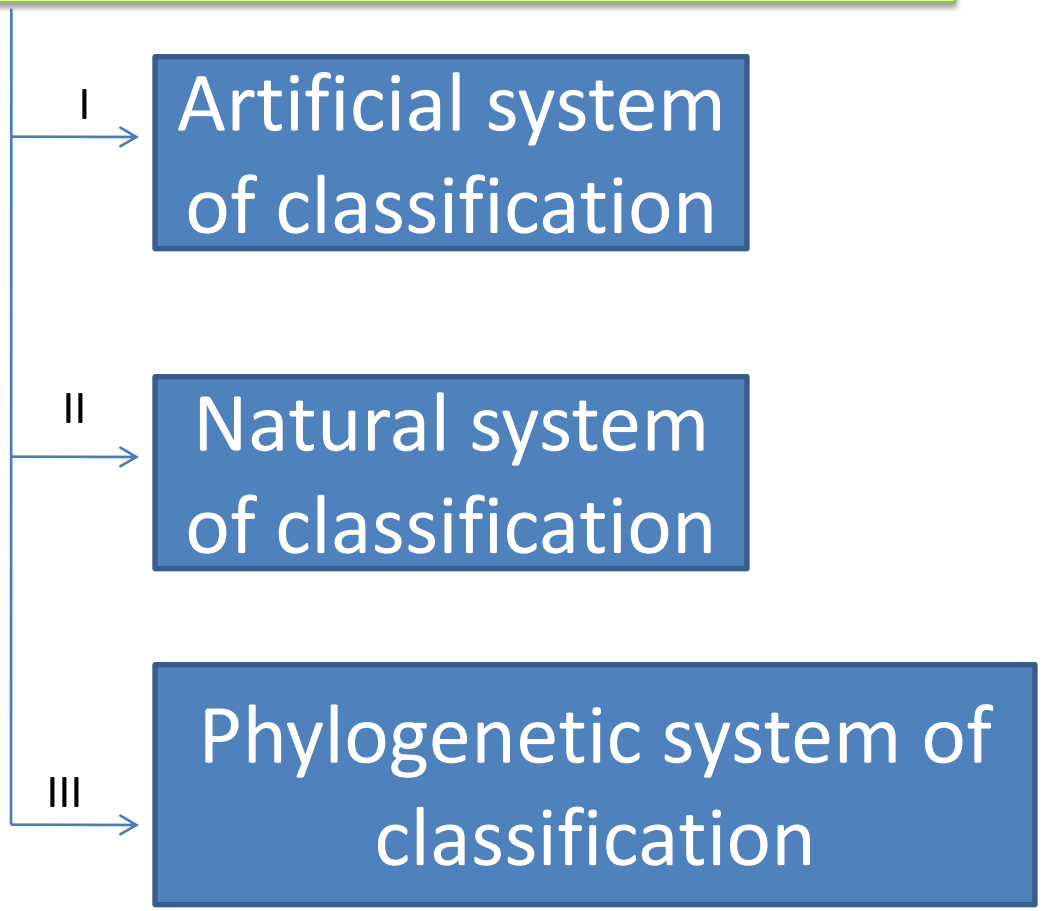


1. Artificial system of classification

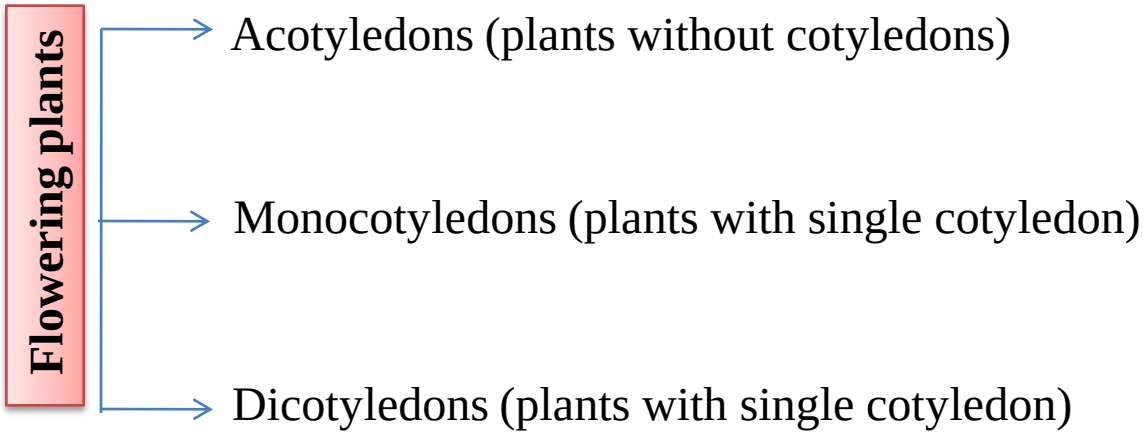
- It is based on superficial characters such as- plant habit (herb, shrub or tress).
- John Ray (1627-1705), an English naturalist, in his book "Methods Plantarum Nova" (1682) for the first time divided herbs, shrubs and trees into dicotyledons and monocotyledons on the basis of two or one cotyledons.
- Carolus Linnaeus (also called Carl Linnaeus) (1707-1778), classified 7300 species of plants into 24 classes, mainly on the basis of number, union and length of stamens.

2. Natural system of classification

▪ In these systems the organisms are classified on the basis of their natural affinities (i.e. the basic similarities in the morphology) rather than on a single character for determining the affinities.

▪**Some important workers are-**

a)A.L. de Jussieu (1748-1836) published a natural system of classification of plants in his book "Genera Plantarum secundus ordines Naturales Disposita". He grouped all plants into 15 classes which were further divided into 100 orders (now called families). He took the characters- number cotyledons, no. of petals and position of petals.



b) A.P. de Candolie (1778-1841) - A French botanist published "Theorie elementaire de la Boanique" in which he classified about 58,000 species into 161 families. He divided plants into two major groups i.e. cellulares (non-vascular plants) and vasculares (vascular plants).

c) George Bentham (1800-1884) and Dalton Hooker (1817-1911)- These two british taxonomist given the best natural system of classification known as "**Bentham and Hooker's Classification**". They recorded precise description of most of the plants known at that time in their monumental work published in three volumes of **"Genera Plantarum"** published in Latin during July 1862 and April 1883.

Salient Features of Bentham and Hooker's classification

❖It is a classification of only the "seed plants" or phanerogams.

❖ They described **97,205** species of seed plants belonging to 7,569 genera of **202** families starting from Ranunculaceae up to Poaceae.

❖ They classified all the seed plants into 3 groups or classes i.e. Dicotyledons (165 families), gymnosperms (3 families) and monocotyledons (34 families).

❖ They included disputed orders among Ordines Anomali which they could not place satisfactorily.

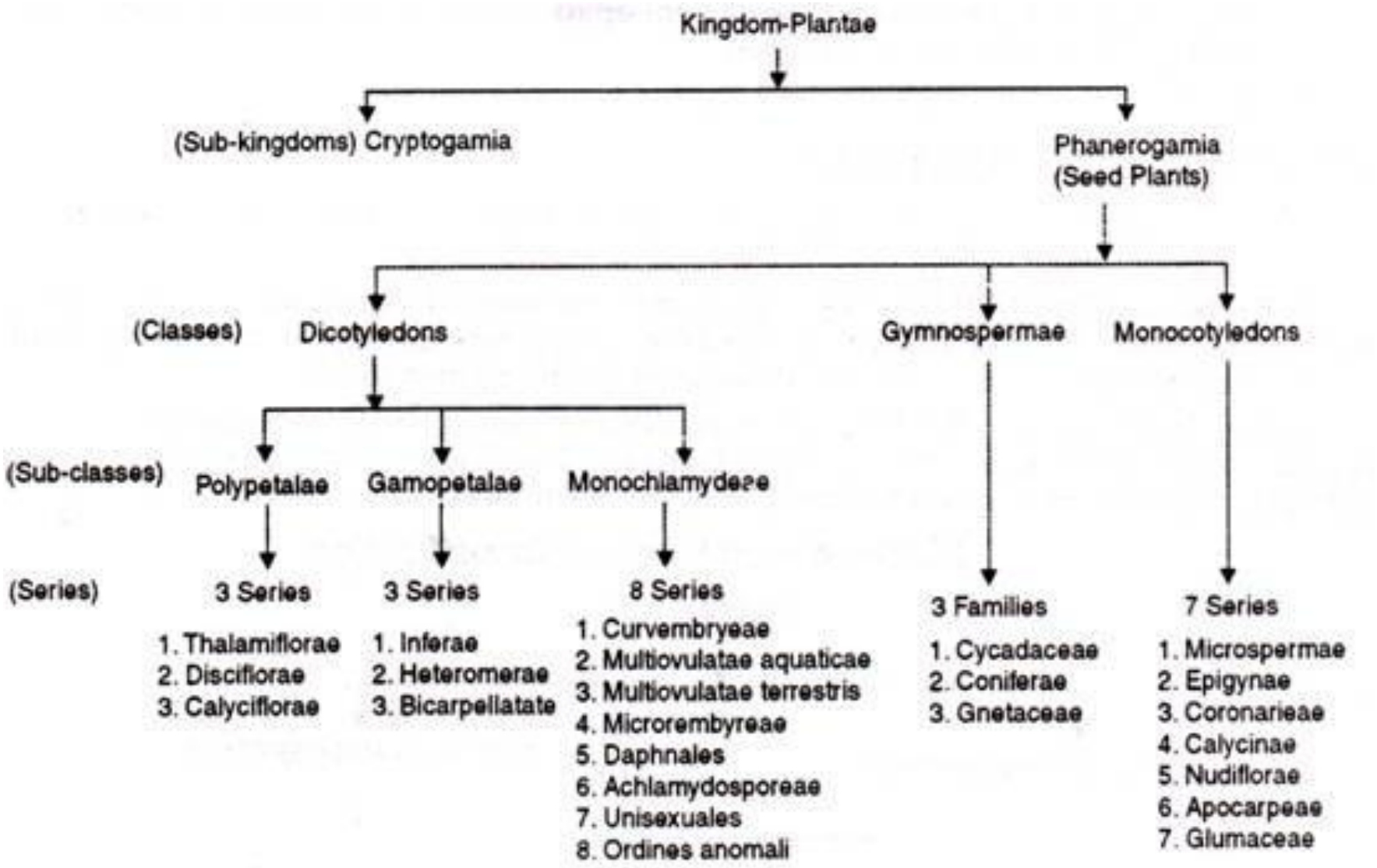
❖ Monocotyledons were described after the dicotyledones.

❖ The dicotyledons were divided into 3 Divisions (Polypetalae, Gamopetalae and Monochlamydeae) and 14 series. Each series again divided into cohorts (modern orders) and cohorts into orders (modern families).

❖ Among the Monochlamydeae, major taxa, like the series, were divided on the basis of terrestrial and aquatic habits.

❖ Polypetalae carries 82 families, 2610 genera & 31,874 species. Gamopetalae carries 45 families 2619 genera & 34,556 species. Monochlamydae includes 36 families, 801 genera & 11,784 species. Similarly Monocotyledons consist 34 families, 1495 genera and 18,576 species.

Overview of Bentham and Hooker Classification



Merits of Bentham and Hooker's System:

- Each plant has been described either from the actual specimen or preserved herbarium sheets so that the descriptions are detailed as well as quite accurate.
- The system is highly practical and is useful to students of systematic botany for easy identification of species.
- The flora describes geographical distribution of species and genera.
- The generic descriptions are complete, accurate and based on direct observations.
- Larger genera have been divided into sub genera, each with specific number 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 and according to evolutionary trends.
- The placing of series disciflorae in between thalami florae and calyciflorae is quite natural.
- The placing of gamopetalae after polypetalae is justified since union of petalsis considered to be an advanced feature over the free condition.

Demerits of Bentham and Hooker's System:

- Keeping gymnosperms in between dicots and monocots is anomalous.
- Subclass monochlamydeae is quite artificial.
- Placing of monochlamydeae after gamopetalae does not seem to be natural.
- Some of the closely related species are placed distantly while distant species are placed close to each other.
- 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.
- There were no phylogenetic considerations.

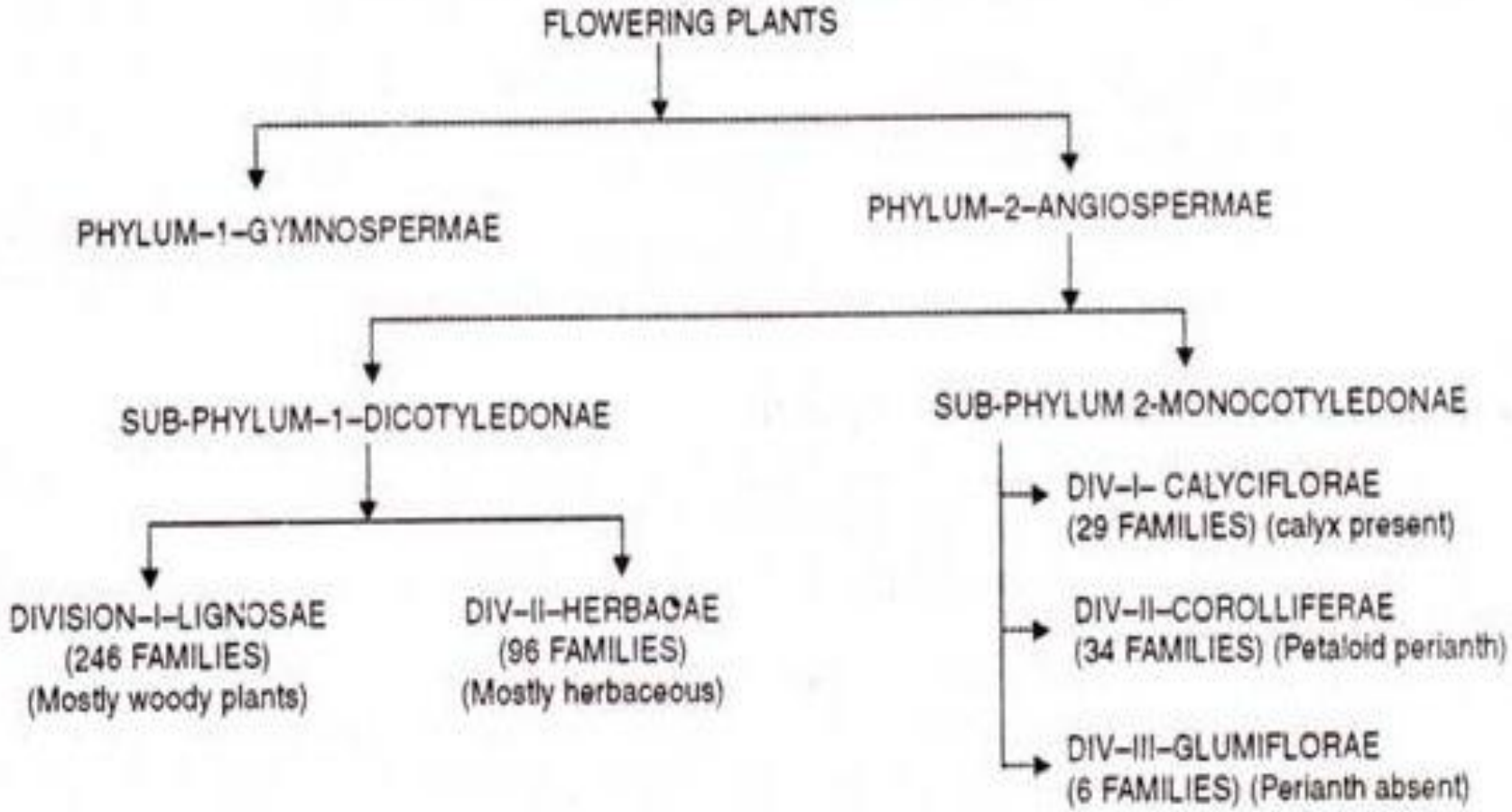
3. Phylogenetic Systems of classification

 # Classification based on evolutionary features is known as phylogenetic system.

Important phylogenetic systems are:

- **Engler and Prantl classification (1884-1930)-** They published detailed classification in 23 volumes of "**Die Naturlichen Pflanzenfamilien**". They arranged flowering plants according to increasing complexity of their floral morphology. They considered monocot' primitive than dicots.
- **John Hutchinson (1884-1972):** He was author of "Families of flowering plants" (in 2 volumes) and director of Royal Botanic Garden at Kew, England. Classification proposed by him was based on 24 principles. This system is mostly followed. They placed monocots after dictos.

Outline of Hutchinson's Classification



Available other sources -
https://www.slideshare.net/DrRaviPrasadRaoBoyin/angiosperm-classifications