

BENTHAM AND HOOKER SYSTEM

Bentham and Hooker jointly published a vast work the *Genera Plantarum* 3 Vols. 1862-63 (in Latin) in which they arranged their species according to a natural system. Several floras prepared from British colonies were based on this system. There are marked similarities between this system and that of Bessey. Bentham and Hooker system also shows many similarities with the system propounded by another British taxonomist Hutchinson. One of the greatest advantages of this system is its usefulness for pedagogic deliberations.

- Joseph Dalton Hooker was the first director of ***Kew botanical garden***. He explored the Antarctic and the Himalayas. He came in contact with George Bentham, an amateur Botanist. Bentham joined the staff of Kew in 1854. After a few years Bentham began his work on ***Genera Plantarum*** in which he was assisted by Hooker. Bentham was responsible for nearly two-third of the work.
- Hooker became the director of Kew in 1865 and continued there till 1885. After retirement prepared ***Index kewensis***. He published 7 volume Flora of British India.

SPECIAL FEATURES OF THE SYSTEM

- It is a classification of only the “seed plants” or phanerogams
- The seed plants were numbered at 97205 species and distributed among in 202 families starting from Ranunculaceae and ending with Gramineae.
- Monocotyledons were described after dicotyledons.
- The dicotyledons were divided into Polypetalae, Gamopetalae and Monochlamydae.
- Creation of the Disciflorae, a taxon not described by earlier taxonomists.
- The Gymnosperms were considered a third taxon of seed plants and placed between the dicots and monocots.
- The authors do not mention anything about the origin of angiosperms.
- Among the Monochlamydeae, major taxa like the series were divided on the basis of terrestrial and aquatic habits.

- Seed plants are divided into three classes Dicotyledonae, Gymnospermae and Monocotyledonae. The Dicotyledonae are subdivided into three subclasses: Polypetaleae, Gamopetaleae and Monochlamydeae.

The Dicotyledons have Tap root system, leaves with reticulate venation, pentamerous or tetramerous flowers and embryo with two cotyledons.

In Polypetalae, flowers are with ***two whorls of perianth*** while of corolla lobes are free(petals are free). Polypetalae is further subdivided into three series, namely ***Thalamiflorae, Disciflorae*** and ***Calyciflorae***. The series are further divided into orders and families.

In ***Gamopetalae*** flowers are with ***two whorls of perianth*** the inner whorl is ***gamophyllous*** (gamopetalous). Gamopetalae is further divided into three series namely Inferae, Heteromerae and Bicarpellate with orders and families.

In ***Monochlamydeae*** flowers are mostly with a ***single whorl of perianth***. The Monochlamydeae is further divided into series bearing families directly.

The ***monocotyledons*** have adventitious roots, leaves with parallel venation, trimerous flowers and embryo with a single cotyledon.

POLYPETALAE

Polypetalae are further divided into three subseries:

Thalamiflorae, Disciflorae and Calciflorae. Among Polypetalae there are 15 orders and 84 families.

Thalamiflorae: *Renales, Perietales, Poygalinae, Caryophyllinae, Guttiferales, Malvales;*

Disciflorae: *Geraniales, Olacales, Celastrales, Sapindales;*

Calycyflorae: *Rosales, Myrtlaes, Passiflorales, Ficoidales, Umbellales.*

In the Thalamiflorae, thalamus is conical elongated or convex but in Disciflorae it is flattened into a disc; in Calyciflorae thalamus is either concave or in the shape of a deep cup intimately fused with the ovary. These three series are again divided into cohorts and cohorts and cohorts into families.

GAMOPETALAE

- Gamopetalae is divided into three series i.e. *Inferae*, *Heteromerae* and *Bicarpellate*. There are 10 orders and 45 families.
- *Inferae*: Rubiales, Asterales, Campanales.
- *Heteromerae*: Ericales, Primulales, Ebanales.
- *Bicarpellatae*: Gentianales, Polymoniales, Personales, Lamiales. The first family is Caprifoliaceae and the last one is Plantagineae.
- *Inferae* with inferior Gynoecium having more than two carpels and Bicarpellatae having superior bicarpellary gynoecium.

MONOCHLAMYDEAE

- Monochlamydeae is subdivided into 8 series, starting with Curvembreae and ending with ordines anomala.
- Monocotyledons are divided into 7 series starting with Microspermae and ending with Glumaeceae.
- Monocotyledons: Microspermae, Epigynae, Coronarieae, Calycinae, Nudiflorae, Apocarpae and Glumaceae. There are 34 families starting with Hydrocharitaceae and ending with Gramineae.
- Gymnosperms are placed in between the dicots and monocots. They are divided into three families:
- Cycadaceae, Coniferaceae and Gnetaceae.

MERITS

- 1. The system is a natural one and has been found suitable for practical purposes.
- 2. The series are divided into cohorts and cohorts into families; every genus is subdivided into genera and sections.
- 3. The system starts with Ranales which are now considered to be most primitive living angiosperms.
- 4. They believed in evolution through reduction hence placed monocots after dicots; even in dicots, the dichlamydous polypetalae and gamopetalae were placed before the uniseriate monochlamydeae.
- 5. In gamopetalae, the position of Heteromerae before Bicarpellatae is justified.
- 6. Creation of Monochlamydeae at the end of Dicots.
- 7. Inclusion of disputed families in Ordines anomaly.
- 8. Among Monocots emphasis has been given to the relative position of ovary and the characters of perianth.

- 9. Placing of unisexual monocot families after bisexual families e.g. Palmae and Araceae after Liliaceae.
- 10. The placing of gamopetalae after polypetalae is justified since union of petals is considered to be an advanced feature over the free condition.

DEMERITS

- 1. Compositae which is a very advanced family is placed in Inferae at the beginning of Gamopetalae.
- 2. Chenopodiaceae and Caryophyllaceae are kept separately among dicots. They should be brought close to each other and not kept remote from each other.
- 3. In monocots, the first series, the Microspermae and Epigynae have epigynores families and they should have been at the end instead of at the beginning of monocots.
- 4. Advanced families like Orchidaceae and Scitamineae are treated at the beginning of monocots.
- 5 The typical hypogynous family, should have been at the beginning is placed in the third series of monocots (Coronarieae).

- 6. Liliaceae and Amaryllidaceae were kept apart though they were closely related.
- 7. The amaryllidaceae which is more allied to Liliaceae is clubbed with Scitamineae in series Epigynae on account of inferior gynoecium.
- 8. Juncaceae, which is connected with palmae, should be drawn nearer to Liliaceae.
- 9. The position of series Aporaceae free and superior carpels is unsatisfactory.
- 10. In the use of terminology of different ranks of taxa there is no uniformity.