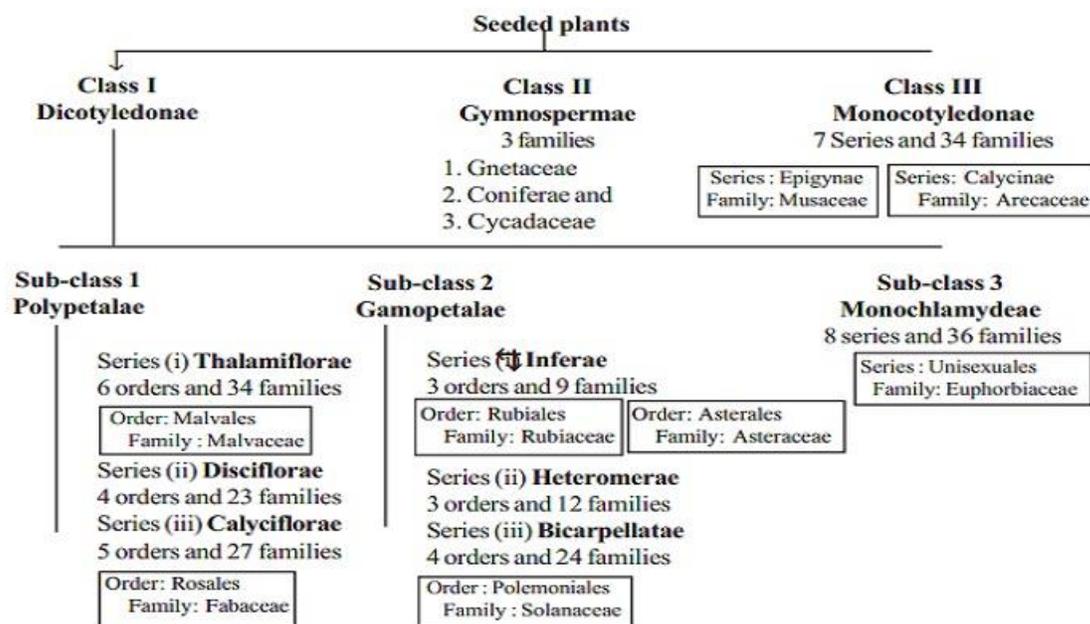


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### Bentham and Hooker's system of classification



*Outline of Bentham and Hooker's classification of plants*

It is a natural system of classification and is based on important characters of the plants. Even today this system is being followed in India, United Kingdom and several other Commonwealth countries. It is also used in a number of herbaria and botanical gardens all over the world. It is a well known and widely accepted classification of seeded plants. It was proposed by two English botanists George Bentham (1800-1884) and Sir Joseph Dalton Hooker (1817-1911). Their system of classification was published in '**Genera Plantarum**' in three volumes and they had described 97,205 species of seeded plants in 202 orders (now referred to as families). In Bentham and Hooker's classification of plants, the present day 'orders' were referred to as 'cohorts' and 'families' as 'orders'.

The seeded plants are divided into three classes '**Dicotyledonae, Gymnospermae and Monocotyledonae.**

**Class I Dicotyledonae:** Seeds of dicotyledonous plants contain two cotyledons. Leaves show reticulate venation. Flowers are tetramerous or pentamerous having four or five members in various floral whorls respectively. It includes three sub-classes ' Polypetalae, Gamopetalae and Monochlamydeae.

**Sub-class I Polypetalae:**Plants having flowers with free petals come under polypetalae. The flowers are with distinct calyx and corolla. It is further divided into three series - Thalamiflorae, Disciflorae and Calyciflorae.

**Series (i) Thalamiflorae:**It includes plants having flowers with dome or conical thalamus. Ovary is superior. Thalamiflorae includes 6 orders and 34 families. The family Malvaceae is placed in the order Malvales.

*Series (ii) Disciflorae:* It includes flowers having prominent disc shaped thalamus below the ovary. Ovary is superior. Disciflorae is divided into 4 orders and 23 families.

**Series (iii) Calyciflorae:** It includes plants having flowers with cup shaped thalamus. Ovary is superior or inferior sometimes half inferior. Calyciflorae includes 5 orders and 27 families. The family Fabaceae is placed in the order Rosales.

**Sub-class 2. Gamopetalae:** Plants having flowers with petals, which are either partially or completely fused to one another are placed under Gamopetalae. The sepals and petals are distinct. Gamopetalae is further divided into three series ' Infracae, Heteromerae and Bicarpellatae.

**Series (i) Infracae:** The flowers are epigynous and ovary is inferior. Infracae includes 3 orders and 9 families. The family Rubiaceae is placed in the order Rubiales and Astraceae in Astrales.

**Series (ii) Heteromerae:**The flowers are hypogynous and ovary is superior with more than two carpels. Heteromerae includes 3 orders and 12 families.

**Series (iii) Bicarpellatae:**The flowers are hypogynous and ovary is superior with two carpels only. Bicarpellatae includes 4 orders and 24 families. The family Solanaceae is placed in the order Polemoniales.

**Sub-class 3. Monochlamydeae:** Plants having flowers with single whorl of perianth are placed under Monochlamydeae. Flowers are incomplete. The sepals and petals are not distinguished and they are called perianth. Tepals are present in two whorls. Sometimes both the whorls are absent. Monochlamydeae includes 8 series and 36 families. The family Euphorbiaceae is placed in the series Unisexuales.

**Class II Gymnospermae:**The members of this class have naked ovules or seeds. Ovary is absent and gymnospermae includes three families ' Gnetaceae, Coniferae and Cycadaceae.

**Class III Monocotyledonae:**Seeds of monocotyledonous plants contain only one cotyledon. Leaves show parallel venation. Flowers are trimerous having three members in various floral whorls. The plants have fibrous root system. The Monocotyledonae has 7 series and 34 families. The family Musaceae is placed in the series Epigynae and Areaceae in Calycinae.

#### **Merits of Bentham and Hooker's classification of plants**

1. Bentham and Hooker's classification is the most natural system, based on actual examination of specimens.
2. The description of plants is quite accurate and reliable.
3. As it is easy to follow, it is used as a key for the identification of plants in Kew herbarium and several other herbaria of the world.
4. Although this system is natural, most of the aspects of this system show affinity to modern concepts of evolution. For example, the order Ranales, which is the first order in the arrangement of plants, has been given a primitive position in this system. Recent taxonomic findings also indicate that the members of Ranales are the most primitive living angiosperms.
5. The placement of monocotyledonae after the dicotyledonae also appears to be in accordance with the evolutionary trends.

#### **Demerits of Bentham and Hooker's classification of plants**

1. The placement of Gymnospermae in between dicotyledonae and monocotyledonae is an error.
2. Several important floral characters have been neglected in this system.
3. Advanced family Orchidaceae has been considered as primitive among monocotyledons and it is placed in the beginning of the system.
4. In this system, some closely related families have been separated and placed under different groups. For example, all the families of series

Curvembryae of Monochlamydeae are related to Caryophyllaceae of series Thalamiflorae of Polypetalae, but they are separated. Unrelated families have been grouped nearer. For example, Podostemaceae of series Multiovulatae aquaticae of Monochlamydeae deserves a place in Rosales of the series Calyciflorae of Polypetalae. Similarly Laurineae of series Daphnales of Monochlamydeae deserves a place in Ranales of the series Thalamiflorae of polypetalae. Thus, two unrelated families Podostemaceae and Laurineae are grouped nearer.