

**BRABU MUZAFFARPUR, RDS COLLEGE, DEPARTMENT OF BOTANY,**

**ASST.PROF -DR. PRIYANKA CHATTERJEE, B.SC-PART II, PAPER-III, GROUP-B.**

**TOPIC- TAXONOMY**

**SUB TOPIC:-**

## Bentham and Hooker's system of Classification

Two English Taxonomists namely George Bentham and Joseph Dalton Hooker were closely associated with the Royal Botanic Garden at Kew, England have given a detailed classification of plant kingdom, particularly the Angiosperms. An outstanding system of classification of Phanerogams in their famous book *Genera Plantarum* which was published in three volumes between the years 1862 to 1883 by them. It is a natural system of classification.

Bentham and Hooker divided Plant Kingdom into two divisions: Cryptogamia (non-flowering plants) and Phanerogamia (flowering plants). The division Phanerogamia divided into three classes- Dicotyledon, Gymnosperm and Monocotyledon.

### **Class- Dicotyledonae**

This group includes angiosperms in which the seed bears two cotyledons and leaves exhibit reticulate venation. It is divided into three subclasses - Polypetalae, Gamopetalae and Metachlamydae.

#### **Sub-class- Polypetalae**

The flowers contain distinct non-essential whorls calyx and corolla. In the corolla petals are free. This sub-class includes three series Thalamiflorae, Disciflorae and Calyciflorae.

1. **Series Thalamiflorae:** Thalamus drum shaped, many stamens in the androecium, Flower is hypogynous e.g. Michellachampara

2. **Series Disciflorae:** Thalamus expanded and disc present. Hypogynous flowers with a cushion-like disc around or below the ovary e.g. Glycosmis arborea

3. **Series Calyciflorae:** Flowers epigynous or perigynous. Thalamus is in the form of a cup e.g. Senna sophera

#### **Sub-class Gamopetalae**

Flowers with distinct calyx and corolla, and the corolla petals are fused. This sub-class includes following three series:

1. Series Inferae: Flowers with inferior ovary e.g. Mikania cordata
2. Series Heteromerae: Flowers with superior ovary, number of carpels are more than two e.g. Rhododendron arboreum
3. Series Bicarpellatae: Flowers with superior ovary, number of carpels e.g. Leucas aspera

### **Sub-class Monochlamydae**

The flowers are with only one non-essential whorl (perianth) or absence of non-essential whorls. It includes following 8 series:

1. **Series-1 Curvembryae:** Usually single ovule, embryo coiled around the endosperm e.g. Persicaria hydropiper
2. **Series-2 Multiovulate Aquaticae:** Aquatic plants with syncarpous ovary and many ovules e.g. Lacismonadelphus
3. **Series-3 Multiovulate Terrestris:** Terrestrial plants with syncarpous ovary and many ovules e.g. Aristolochia indica
4. **Series-4 Microembryae:** Only one ovule, small, tiny embryo endospermic seed e.g. Piper nigrum.
5. **Series-5 Daphnales:** Only one carpel and contains single ovule.
6. **Series-6 Achlamydosporae:** Ovary inferior, 1 to 3 ovules –unilocular e.g. Santalum album
7. **Series-7 Unisexuales:** Flower unisexual, perianth usually absent e.g. Croton bonplandianum.
8. **Series-8 Ordines Anomali:** (Anomalous families) Plants with uncertain systematic position but closer to unisexuales e.g. Ceratophyllum demersum

### **Class- Gymnospermae**

This group includes the gymnosperms in which seeds are not enclosed in fruits. This class is divided into three families Gnetaceae, Coniferales and Cycadaceae.

### **Class Monocotyledonae**

This group includes angiosperms in which the seed bears only one cotyledon. The leaves exhibit parallel venation. It is divided into the following seven series:

1. **Series Microspermae:** Ovary is inferior, seeds are minute and non-endospermic e.g. Vallisneria spiralis
2. **Series Epigynae:** Ovary inferior, seeds are large and endospermic e.g. Musa paradisiaca

**3. Series Coronariae:** Ovary superior, perianthpetalloid e.g. *Allium cepa*.

**4. Series Calycinae:** Ovary superior, perianthsepalloid e.g. *Cocos nucifera*.

**5. Series Nudiflorae:** Perianth reduced or absent. Seeds are endospermic e.g. *Lemna minor*.

**6. Series Apocarpae:** Carpels more than one, free, seeds are endospermic e.g. *Sagittariasinensis*.  
Series Glumaceae: Perianth reduced or absent, scaly bracts present e.g. *Oryza sativa*.

Each of the series mentioned under dicotyledonae and monocotyledonae have been further divided into orders and families. Bentham and Hooker classified the angiosperms into 202 families. They were able to provide distinct diagnostic key characters to each of these families.

**Merits of Bentham and Hooker's system:**

- 1) It is simple and easy to use for practical purpose.
- 2) Every genus and species were studied from the actual specimens
- 3) Ranales is placed first in the dicot which is very reasonable.
- 4) Monocots followed dicots
- 5) Gymnosperms were treated by Bentham and Hooker as a third taxon and placed between dicot and monocot.

**Demerits of Bentham and Hooker's system:**

- 1) Placing of Gymnosperms between dicot and monocot is not accepted.
- 2) Artificial characters are considered here and there.
- 3) Monochlamydeae is considered to be the most highly evolved among polypetalae is the most primitive groups among dicots
- 4) Some of the related orders are widely separated from each other.
- 5) There is no uniformity in the arrangement of groups.
- 6) In the classification of monocotyledon, importance is not given to all natural characters.