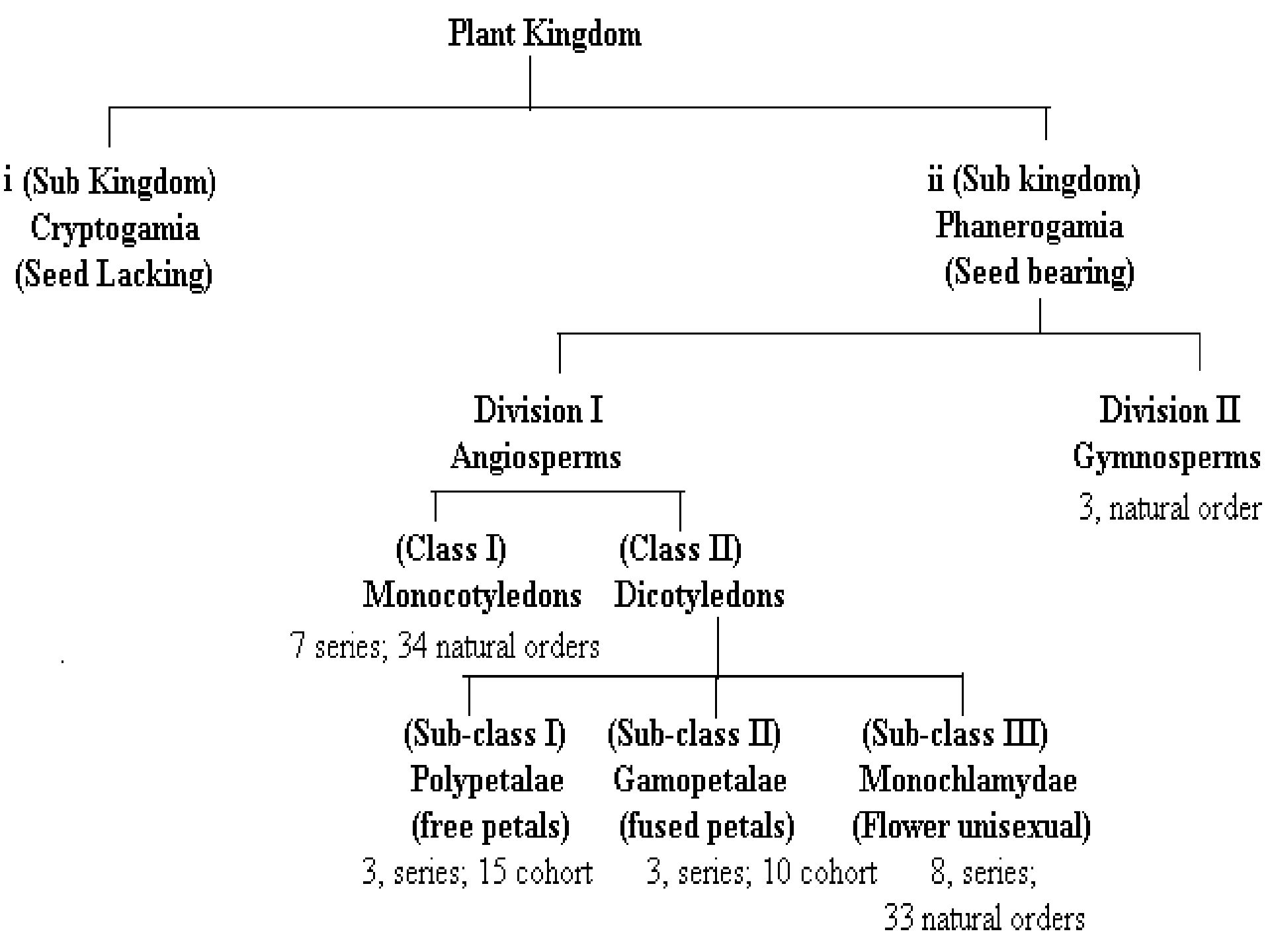
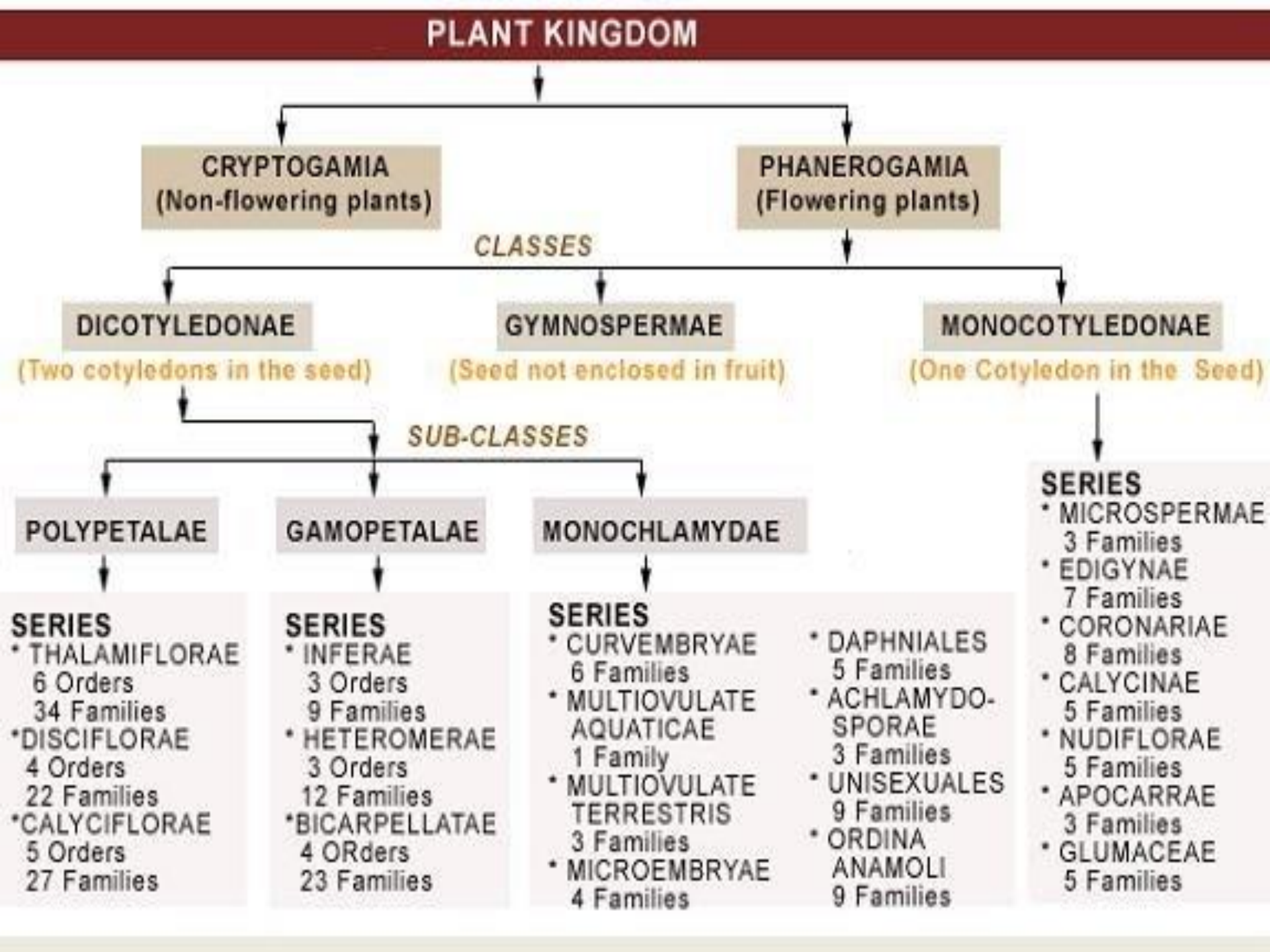
Bentham & Hooker's Classification: Outlines, Merits & Demerits

Dr Nishi Kumari
Associate Professor
Department of Botany
MMV, BHU, Varanasi

- George Bentham and Joseph Dalton Hooker - Two English taxonomists who were closely associated with the Royal Botanical Garden at Kew, England have given a detailed classification of plant kingdom, particularly the angiosperms.
- They gave an outstanding system of classification of phanerogams in their Genera Plantarum which was published in three volumes between the years 1862 to 1883. It is a natural system of classification.
- They described 97,205 species of flowering plants grouped into 202 orders (now recognised as families).
- The system has the advantage of being the first great natural system of classification, which is very easy to follow.


Plant Kingdom
i (Sub Kingdom)
Cryptogamia
(Seed Lacking)
ii (Sub kingdom)
Phanerogamia
(Seed bearing)
Division I
Angiosperms
Division II
Gymnosperms
3, natural order
(Class I)
Monocotyledons
7 series; 34 natural orders
(Class II)
Dicotyledons
(Sub-class I)
Polypetalae
(free petals)
3, series; 15 cohort
(Sub-class II)
Gamopetalae
(fused petals)
3, series; 10 cohort
(Sub-class III)
Monochlamydae
(Flower unisexual)
8, series;
33 natural orders


PLANT KINGDOM
CRYPTOGAMIA
(Non-flowering plants)
PHANEROGAMIA
(Flowering plants)
CLASSES
DICOTYLEDONAE
(Two cotyledons in the seed)
GYMNOSPERMAE
(Seed not enclosed in fruit)
MONOCOTYLEDONAE
(One Cotyledon in the Seed)
SUB-CLASSES
POLYPETALAE
GAMOPETALAE
MONOCHLAMYDAE
SERIES
• THALAMIFLORAE
6 Orders
34 Families
•DISCIFLORAE
4 Orders
22 Families
•CALYCIFLORAE
5 Orders
27 Families
SERIES
• INFERAE
3 Orders
9 Families
• HETEROMERAE
3 Orders
12 Families
•BICARPELLATAE
4 ORders
23 Families
SERIES
• CURVEMBRYAE
6 Families
• MULTIOVULATE AQUATICAE
1 Family
• MULTIOVULATE TERRESTRIS
3 Families
• MICROEMBRYAE
4 Families
• DAPHNIALES
5 Families
• ACHLAMYDO-SPORAE
3 Families
• UNISEXUALES
9 Families
• ORDINA ANAMOLI
9 Families
SERIES
• MICROSPERMAE
3 Families
• EDIGYNAE
7 Families
• CORONARIAE
8 Families
• CALYCINAE
5 Families
• NUDIFLORAE
5 Families
• APOCARRAE
3 Families
• GLUMACEAE
5 Families

Main Features of classification

i) This system includes the names and descriptions of all genera, of seed plants known so far and classified accordingly.

ii) This system divided seed plants into 97,205 species under 202 order or families.

iii) They divide seed plants into three classes in sequence. Discotyledon, gymnosperm and monocotyledon.

iv) Dicots divided into 3-divisions and 14 series on the basis of the natural and visual characteristic which provides key for identification.

v) Diocts started with family Ranun Culaceae having free sepals and petals and indefinite number of stamens and carpels are free where as it ends with labiatale having fused sepals and petals with definite number of carpels and stamens.

vi) 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.

Merits of Bentham and Hooker's System I

- 1. The description of families and genera is very accurate.
- 2. The system is very handy for identification purposes.
- 3. The system is of great practical convenience.

  The British and Commonwealth herbaria therefore still adopt this system in arrangement of families.
- 4. Each family had a synopsis at the beginning which is very useful in identification.

Merits of Bentham and Hooker's System II

- 5. The system starts from Ranales, which are now universally considered to be most primitive living angiosperms.
- 6. Larger genera subdivided into subgenera and sections.
- 7. They believed in evolution through reduction and hence placed monocots after dicots; even in dicots, the dichlamydeous polypetalae and gamopetalae were placed before the uniseriate monochlamydeae.
- 8. The gamopetalae placed after polypetalae is justified since union of petals is considered to be an advanced feature.

Merits of Bentham and Hooker's System III

- 9. The polypetalae includes Thalamiflorae and Calyciflorae of de Candolle. But Bentham and Hooker distinguished a new series Disciflorae which includes orders which cannot be assigned to Thalamiflorae or Calyciflorae.
- 10. The 3 series – Thalamiflorae, Disciflorae and Calyciflorae show gradual evolutionary advance from marked hypogyny to epigyny.
- 11. Treating Cucurbitaceae and Umbelliferae (Apiaceae) at the end of Polypetalae as connecting links between poly- and gamopetalous families.
- 12. Creation of Monochlamydeae at the end of Dicots.

Merits of Bentham and Hooker's System IV

- 13. Disputed families included in Ordines anomali.
- 14. Placing of unisexual monocot families after bisexual families e.g. Palmae and Araceae after Liliaceae.
- 15. The series Glumaceae with extremely reduced flowers and inflorescences, placed at the end of the flowering plants.
- 16. The system was never conceived by its authors on the basis of phylogeny. The theory of organic evolution (theory of descent) was announced independently by Darwin and Wallace in 1859. So, any criticism of the system on the basis of phylogeny is not too justified.

Demerits of Bentham and Hooker's Classification I

1. The system does not give any idea as to the evolutionary history of any genus, family or order.
2. In this system grouping of plants is mainly based on single and artificial characters; with the result, that closely allied families are placed widely apart.
3. The group "Monochlamydeae" is entirely artificial.

Demerits of Bentham and Hooker's Classification I

- 4. Gymnospermae is placed between the Dicotyledones and Monocotyledones, which is extremely anomalous.
- 5. The system does not show any phylogenetic relationship. The main demerit is that this system does not give us any idea as to the evolutionary history of any genus, family or order nor does it give any idea of phylogenetic relationship between them.
- 6. Compositae (Asteraceae) is a highly advanced family and placed in Inferae at the beginning of Gamopetalae.
- 7. Advanced families like Orchidaceae and Scitamineae are treated in the beginning of monocots.

Demerits of Bentham and Hooker's Classification I

- 8. Liliaceae and Amaryllidaceae were kept apart though they are very closely related.
- 9. The Amaryllidaceae is more allied to Liliaceae but is clubbed with Scitamineae in series Epigynae, on account of inferior gynoecium
- 10. The position of series Apocarpae is unsatisfactory due to its free and superior carpels.