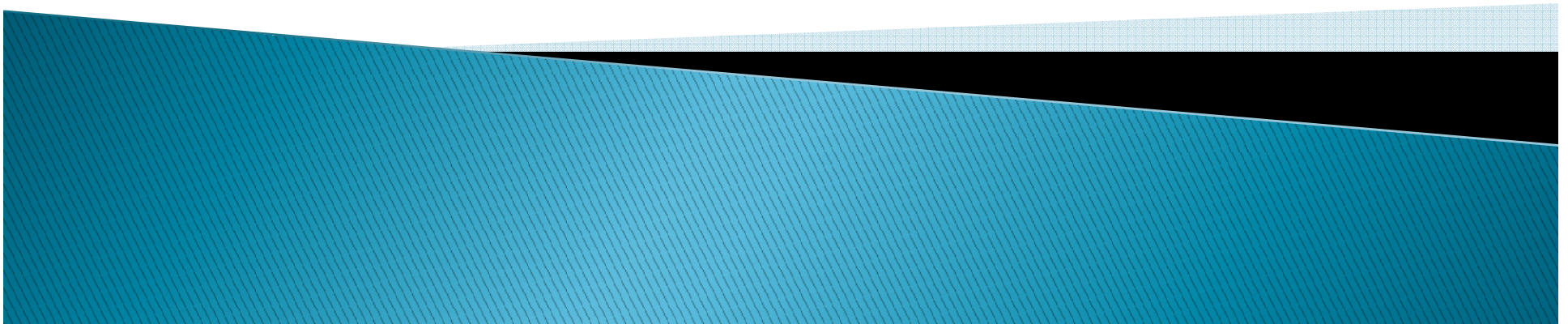


Hutchinson's System of Classification of Angiosperms M.Sc. II Sem, Paper I, Unit I

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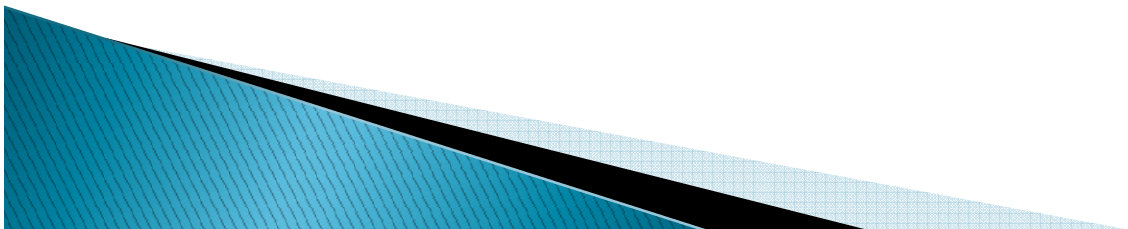


John Hutchinson

John Hutchinson (1884-1972) was a British botanist associated with the Royal Botanic Gardens, Kew, England who also served as keeper of Kew herbarium for many years. He published a phylogenetic system of classification of Angiosperms in 2 volume book entitled "*The Families of Flowering' Plants*" (1926-1934). The volume I deals with Dicots while the Volume II having Monocots. The revised and detailed treatment of the system was published in 1959 and the most recent revised system appeared in 1973, one year after his demise.

In addition to presenting his system of classification for angiosperms, Hutchinson also published valuable works such as -

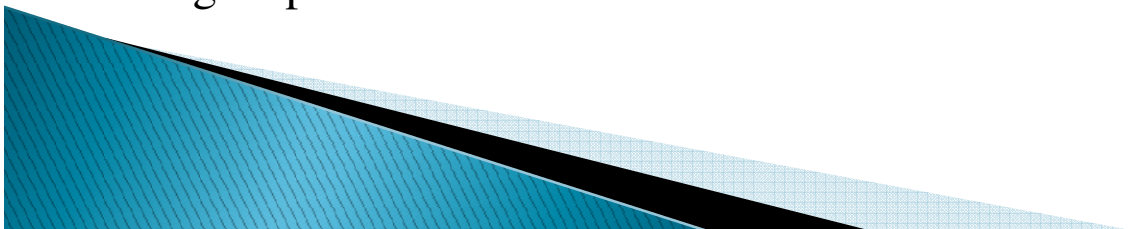
1. *Flora of West Tropical Africa* (1927-29)
2. *Common Wild Flowers* (1945)
3. *A Botanist in South Africa* (1946)
4. *Evolution and Classification of Rhododendrons* (1946)
5. *British Flowering Plants* (1948)
6. *More Common Wild Flowers* (1948)
7. *Uncommon Wild Flowers* (1950)
8. *British Wild Flowers* (1955)
9. *Evolution and Phylogeny of Flowering Plants* (1969)
- 10 *Key to the Families of Flowering Plants of the World* (1968)



The classification system of Hutchinson dealt only with the flowering plants, included under **Phylum Angiospermae** as distinct from **Phylum Gymnospermae**.

The classification was based on **24 principles** including General principles, relating to General Habit, General Structure of Flowering plants and those relating to Flowers and Fruits. These **principles** are outlined below:

1. Evolution is both upwards and downwards.
2. Evolution does not necessarily involve all the organs of a plant at the same time; and one organ or set of organs may be advancing while the other may be stationary or retrograding.
3. Evolution has generally been consistent and when a particular progression or retrogression has set in, it is persisted into the end of the phylum.
4. In certain groups, trees and shrubs are probably more primitive than herbs.
5. Trees and shrubs are older than climbers, the latter habit having been acquired through a particular environment.

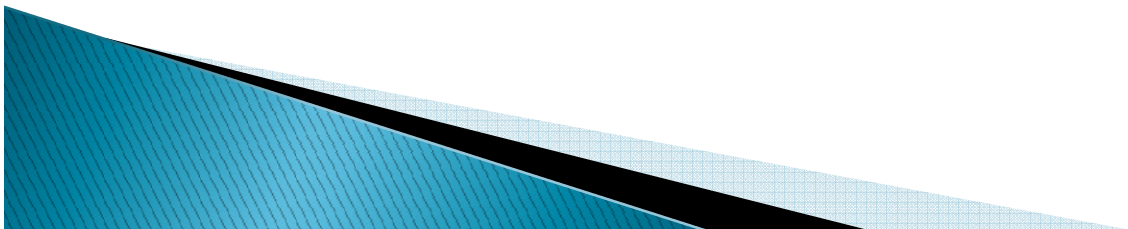


6. Perennials are older than biennials, and from them annuals have been derived.
7. Aquatic flowering plants are derived from terrestrial ancestors, epiphytes, saprophytes and parasites are more recent than plants of normal habit.
8. Plants with collateral vascular bundles arranged in a ring are more primitive in origin than those with scattered bundles.
9. Spiral arrangement of leaves on the stem and of floral leaves precedes that of opposite and whorled types.
10. As a rule, simple leaves precede compound leaves.
11. Bisexual flowers precede unisexual flowers, and the dioecious is probably more recent than the monoecious condition.
12. Solitary flower is more primitive than the inflorescence.
13. Spirally imbricate floral parts are more primitive than whorled and valvate.

Example - Magnolia and Clematis.



14. Many-parted flowers (polymerous) precede, and the type with few parts (oligomerous) follow from it, being accompanied by progressive sterilization of reproductive parts.
15. Petaliferous flowers precede apetalous ones, the latter being the result of reduction.
16. Free petals (polypetaly) are more primitive than connate petals (sympetaly).
17. Actinomorphy of flower is an earlier type than zygomorphy.
18. Hypogyny is the primitive structure, and from it perigyny and epigyny were derived later.
19. Free carpels (apocarpy) are more primitive and from them connate carpels.
20. Many carpels (polycarpy) precede few carpels (oligocarpy).



21. The endospermic seed with small embryo is primitive and the non-endospermic seed having a large embryo is more recent. *e.g.*, Ranunculaceae and Rosaceae

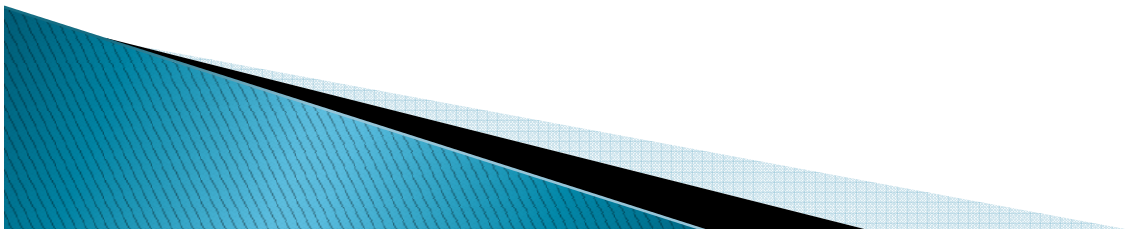
22. Indefinite stamens indicate greater primitiveness than an androecium with a few stamens only.

23. Separate stamens precede connate stamens.

24. Aggregate fruits are more recent than single fruits. Generally, capsule precedes berry or drupe.

Based on these above mentioned **24 phyletic dicta**, Hutchinson proposed

Phylogenetic system of classification. The outline of this system is given below:



1) Hutchinson believed in Monophyletic origin of Angiosperms from a hypothetical group, which he named as Proangiosperms.

2) He traced 2 main lines development of Dicots viz.

i) Lignosae (woody)

ii) Herbaceae (herbaceous)

3) Lignosae has 54 Orders and 251 Families. The starting order is Magnoliales with Magnoliaceae as the starting family passing through Annonales-Rosales-Malvales Rubiales and terminating at Verbenales with verbenaceae as the terminating family.

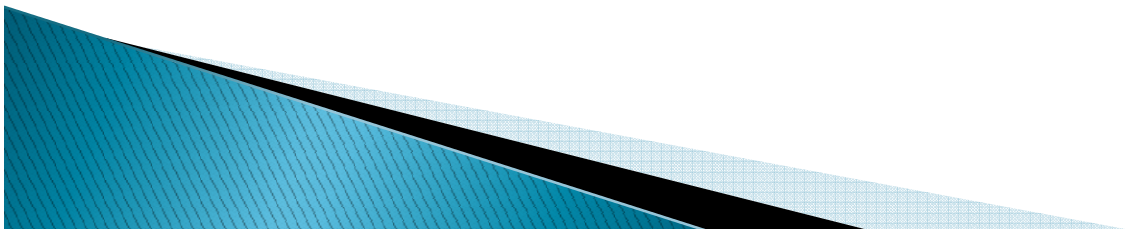


4) Herbaceae has 28 Orders and 100 Families. The starting order is Ranales with Paeoniaceae as the starting family passing through hoedales -Caryphyllales- Umbellales-Asterales and terminating at Lamiales with Lamiaceae (Labiatae) as the ending family,

5) The monocots have 29 Orders and 69 Families. As a whole, Monocots have been subdivided into **3** distinct divisions based on the nature of Perianth viz.

- i) Calyciferae (calyx bearer)
- ii) Corolliferae (corolla bearer)
- iii) Glumiflorae (glumes bearer)

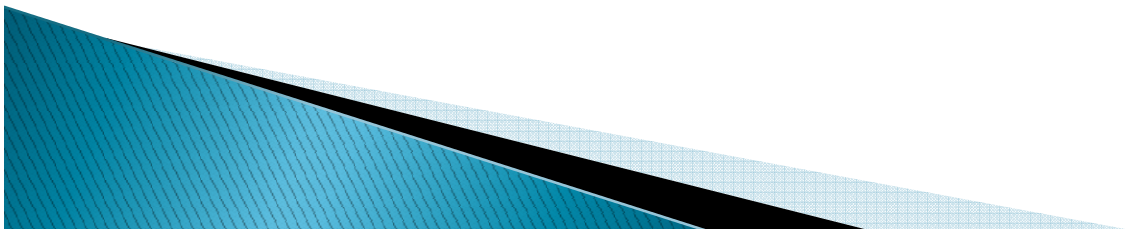
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The starting order of **Calyciferae** is Butomales with Butomaceae as the starting family. The climax (ending) order is Zingiberales with Marantaceae as the ending family

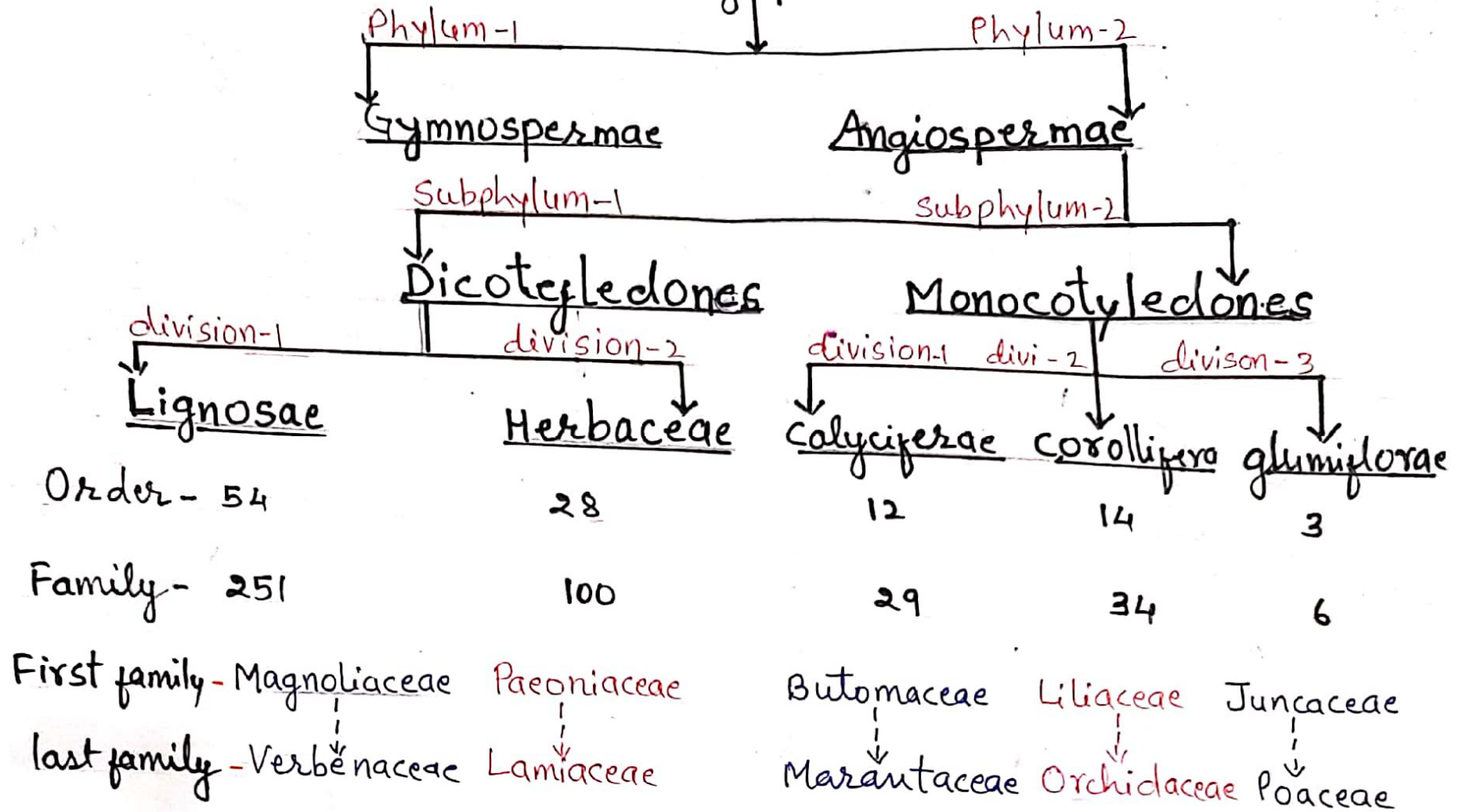
The starting order of **Corolliferae** is Liliales with Liliaceae as the starting family. The terminating order of this group is Orchidales with Orchidaceae as the ending family.

In the case of **Glumiflorae** the starting order is Juncales and Juncaceae as starting family. The climax order is Graminales and Gramineae (Poacea) as the last or terminating family.



Outline of Hutchinson system

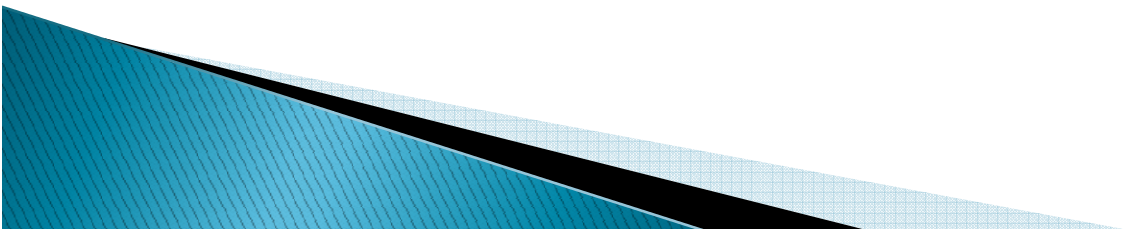
Flowering plants



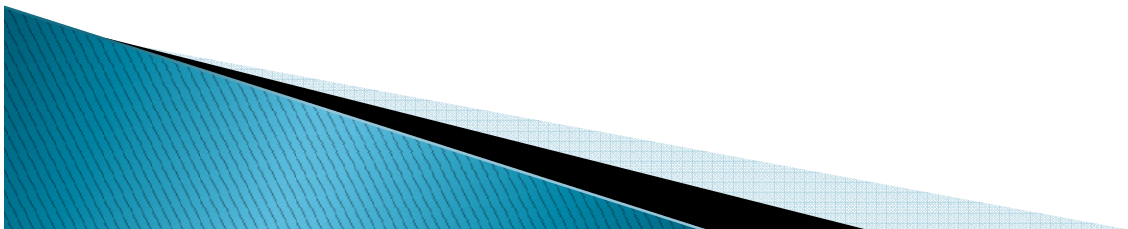
Merits

The system of Hutchinson, being based on a number of sound phylogenetic principles, and studies of a large number of plants at his disposal at Kew, shows the following improvements over earlier systems:

1. The system is more **phylogenetic** as it is based on phylogenetic principles, generally recognized by most authors.
2. The treatment of **Magnoliales** as the starting point in the evolutionary series of Dicotyledones is in agreement with prevalent views.
3. Many large unnatural families have been split into smaller natural ones.



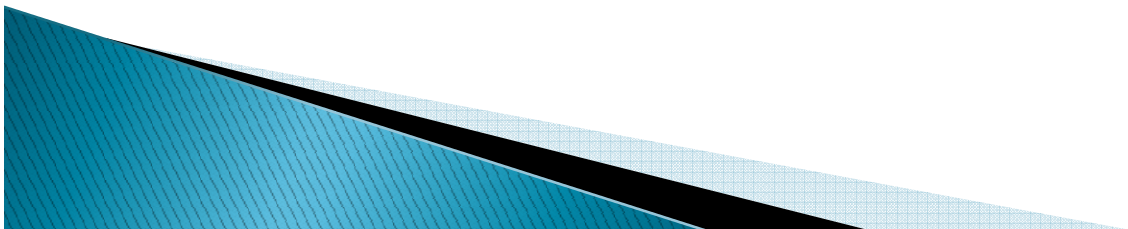
4. The classification of **Monocotyledones** is sounder and generally appreciated, even keys to the identification of **genera** have been provided.
5. The derivation of Monocotyledones from Dicotyledones is widely agreed.
6. Detailed classification up to the generic level, together with identification keys and description has been provided for some families in the two volumes of *The families of Flowering Plants*.
7. The data from Floral Anatomy and Embryology are taken into consideration during the classification of Monocots in particular and Dicots in general.
8. Geographical distribution of most of the genera is included in this system.



Demerits

A number of shortcomings and criticism have been put forward to expose the demerits of the system.

1. More stress is given on Monophyletic origin of Angiosperm from a hypothetical **Proangiosperm**.
2. Due to special emphasis on Herbaceae and Lignosae, some very closely related families have been put apart. For example, Ranunculaceae and Magnoliaceae under Ranales (Herbaceae) and Magnoliaceae (Lignosae) are separated just because of demarcation between Herbaceae and Lignosae.



3. Hutchinson did not provide a full explanation for the majority of his evolutionary concepts.
4. Although he has split several large unnatural families into natural units, in some cases he has even split some families which were already natural monophyletic

However, in the opinion of most taxonomists, Hutchinson has contributed an excellent service by his most careful and critical appraisal of family and ordinal, limitations. His classification has been a greater stimulant to phyletic thinking during the past decades.

