

## Course- B.Sc.Part-I Botany Subsidiary

### PAPER-I

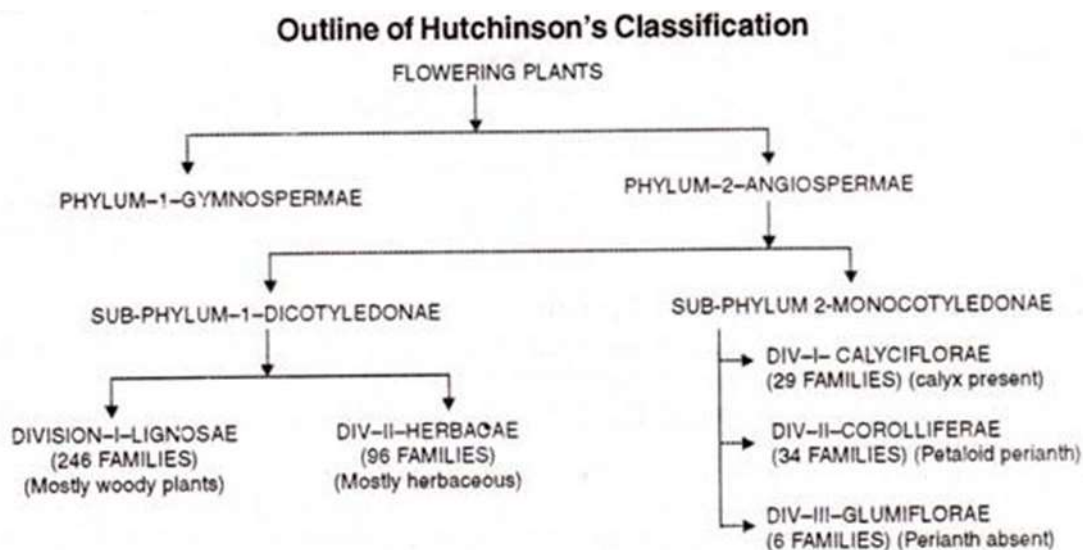
#### Topic - Hutchinson system of classification of Angiosperms and Floral character of family Cucurbitaceae (Angiosperm)

***Prepared by- Prof. (Dr) Shyam Nandan Prasad***

#### Hutchinson system of classification

John Hutchinson (1884-1972):

John Hutchinson was a British botanist associated with Royal Botanic Gardens, Kew, England. He developed and proposed his system based on Bentham and Hooker and also on Bessey. His phylogenetic system first appeared as “The Families of Flowering Plants” in two volumes. The first volume contains Dicotyledons (published in 1926) and second volume contains Monocotyledons (published in 1934). He made several revisions in different years. The final revision of “The Families of Flowering Plants” was made just before his death on 2nd September 1972 and the 3rd i.e., the final edition, was published in 1973.



The following principles were adopted by Hutchinson to classify the flowering plants:

1. Evolution takes place in both upward and downward direction.
2. During evolution all organs do not evolve at the same time.
3. Generally, evolution has been consistent.
4. Trees and shrubs are more primitive than herbs in a group like genus or family.
5. Trees and shrubs are primitive than climbers.
6. Perennials are older than annuals and biennials.

7. Terrestrial angiosperms are primitive than aquatic angiosperms.
8. Dicotyledonous plants are primitive than monocotyledonous plants.
9. Spiral arrangement of vegetative and floral members are primitive than cyclic arrangements.
10. Normally, simple leaves are more primitive than compound leaves.
11. Bisexual plants are primitive than unisexual plants and monoecious plants are primitive than dioecious plants.
12. Solitary flowers are primitive than flowers on inflorescence.
13. Types of aestivation gradually evolved from contorted to imbricate to valvate.
14. Polymerous flowers precede oligomerous flowers.
15. Polypetalous flowers are more primitive than gamopetalous flowers.
16. Flowers with petals are more primitive than apetalous flowers.
17. Actinomorphic flowers are more primitive than zygomorphic flowers.
18. Hypogyny is considered as more primitive from which perigyny and epigyny gradually evolved.
19. Apocarpous pistil is more primitive than syncarpous pistil.
20. Polycarpy is more primitive than gynoecium with few carpels.
21. Flowers with many stamens are primitive than flowers with few stamens.
22. Flowers with separate anthers are primitive than flowers with fused anthers and/filaments.
23. Endospermic seeds with small embryo is primitive than non-endospermic one with a large embryo.
24. Single fruits are primitive than aggregate fruits

#### Merits and Demerits Merits:

1. Hutchinson proposed the monophyletic origin of angiosperms from some hypothetical Proangiosperms having Bennettitalean characteristics.
2. He made a valuable contribution in phylogenetic classification by his careful and critical studies.
3. Monocots have been derived from Dicots.

4. According to him, the definitions of orders and families are mostly precise, particularly in case of subphylum Monocotyledones.

**Demerits:**

1. There is undue fragmentation of families.
2. Too much emphasis is laid on habit and habitat. Thus, creation of Lignosae and Herbaceae is thought to be a defect reflecting the Aristotelean view.
3. The origin of angiosperms from Bennettitalean-like ancestor is criticised by many, because the anatomical structures of the early dicotyledons are not tenable with such ancestry.

**Floral character of family Cucurbitaceae**

Leaves: Petiolate; Leaves are alternate; simple; exstipulate; palmately reticulate venation. Sonnet leaves bear tendrils in their axils.

Inflorescence: The flowers are solitary but some have Racemose or cymose clusters.

Flower: Regular, mostly unisexual rarely bisexual (Schizopepon), incomplete, epigynous, small or large, mostly white or yellow, pentamerous. plant may be monoecious or dioecious; epigenous.

Male flower: Produced in large numbers.

Calyx: Sepals 5, gamosepalous, sepals pointed, rarely petaloid, campanulate, aestivation imbricate.

Corolla: Petals 5, gamopetalous united at the base (Momordica) or through out (Cucurbita, Coccinea), polypetalous (Luffa, Lagenaria), may be campanulate, rotate, imbricate or valvate aestivation.

Androecium: Stamens 5, sometimes free or combined to form a central column, anthers dithecous extrorse, dehiscence longitudinal or in curve

Gynoecium: Reduced or rudimentary or absent.

Female flower: They are fewer in number than the male flowers.

Calyx: Sepals 5, gamosepalous, calyx tube adnate to the ovary wall; imbricate aestivation, superior.

Corolla: Petals 5, gamopetalous, inserted on calyx tube; imbricate aestivation, superior.

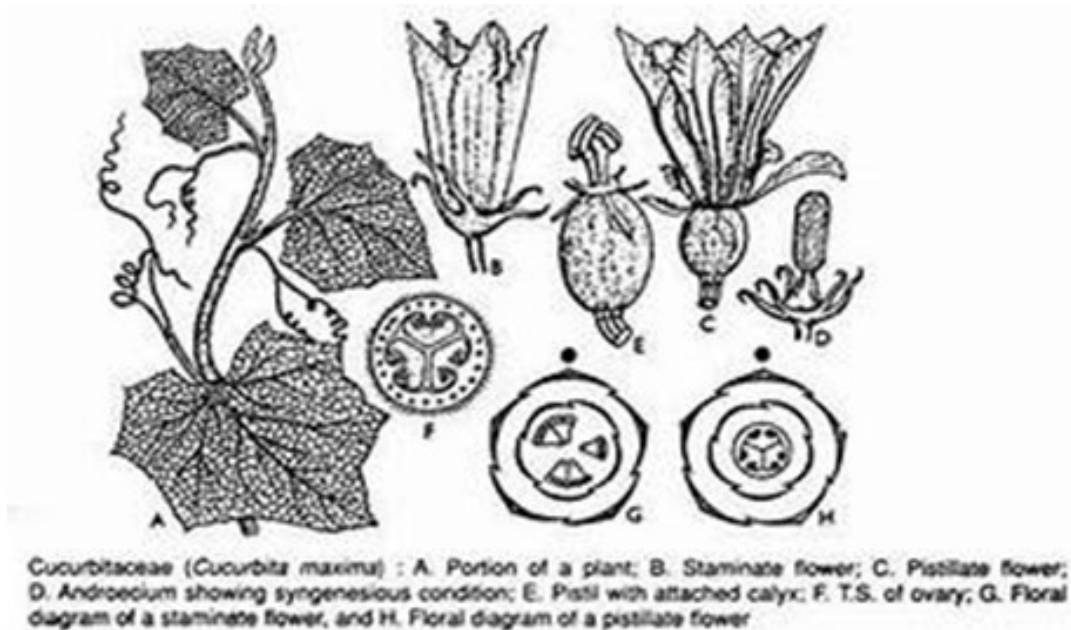
Androecium: Staminodes 0, 3, 5.

Gynoecium: Tricarpellary, syncarpous, ovary inferior, unilocular with parietal placentation, the intruding placentae make the ovary to appear trilobular. In *Luffa* the ovary is narrow and ultimately 3-4 celled and apparently of the axile type. In *Sechium* the ovary is unilocular with only a single ovule; ovule bitegmic. Style stout and columnar and bears a forked stigma for each carpel.

Floral formula

**Male flower** :  $\oplus \delta K(5) C5 \text{ or } (5) A5 \text{ or } (5) G0$

**Female flower** :  $\oplus \text{ } \ominus K(5) C5 \text{ or } (5) A0 \text{ or } 3-5 \text{ staminodes } G(3)$ .



Economic Importance of Cucurbitaceae:

This family is particularly important economically because its fruits are edible.

1. *Cucumis melo* (Hindi – Kharbuza)
2. *Citrullus vulgaris* (Hindi – Tarbuz)
3. *Cucurbita maxima* is Kaddu
4. *Lagenaria vulgaris* is Lauki
5. *Trichosanthes dioica* is Parwal
6. *Momordica charantia* is Karela