Hutchinson's system of classification

John Hutchinson (1884-1972), was a British botanist. He proposed a Phylogenetic system of plants classification, which differed from the ***Engler's*** Phylogenetic system. He was associated with the Royal Botanical Garden, Kew, England. He published his extensive work in his book ***The families of Flowering Plants*** in the year 1926. The first volume covered only Dicots plants, later on the next volume was published in 1934, which dealt with Monocot families. The families of flowering plants were revised in the year 1948 in his ***British Flowering Plants*** and again in 1959 in the second edition of ***The Families of Flowering Plants***. The revised third edition was published in 1973 with minor modifications. He has based his classification more closely related with the system given by Bentham and Hooker and Bessey than that of Engler.

Hutchinson laid down certain principles to interpret the primitive or advanced status, the species deserves.

He considers the primitive polypetalous forms diverged from the beginning along two lines, one the tree like habit (Lignosae) and the Herbaceous habit (Herbaceae).In one type, Magnoliales, tree like habit (arboreal type) is considered primitive and in the other the Ranales is considered (herbaceous habit) as most primitive. Thus, Hutchinson divided Dicotyledones into two divisions 1. The Lignosae and 2. The Herbaceae. According to him Monocots are divided into three divisions.

Gymnosperms are considered as more primitive than Angiosperms.

Hutchinson's revised classification has been based on the following twenty four principles (Hutchinson, 1959):-

1. Evolution is both upwards and downwards. The former tends towards preservation and the later to their reduction and suppression.

2. Evolution does not involve all the parts at a time. One organ or set of organs may be advancing while another set may be stationary or retrograding.

3. Evolution has generally been consistent, and when a particular progression or regression 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.

6. Perennials are older than biennials, and from them annuals have been derived.

7. Aquatic flowering plants as a rule more recent than terrestrial, and the same may be said of epiphytes, saprophytes and parasites.

8. Plants with collateral vascular bundles arranged in a cylinder (Dicotyledons) are more primitive in origin than those with scattered bundles (monocotyledons), though it does not necessarily follow that the latter have been directly derived from the former.

9. The spiral arrangement of leaves on the stem and of the floral leaves (sepals and petals) preceded that of the opposite and whorled type.

10. As a rule simple leaves precede compound leaves.

11. Bisexual precedes unisexual flowers, and the dioecious is probably more recent than the monoecious condition.

12. The solitary flower is more primitive than the inflorescence, the highest forms of the latter being the Umbel and Capitulum.

13. Spirally imbricate floral parts are more primitive than whorled and valvate.

14. Many parted flowers (polymerous) precede, and the type with few parts (oligomerous) follows from it, being accompanied by a progressive sterilization of reproductive parts.

15. Petaliferous flowers precede apetalous, but ones, the latter being the result of reduction.

16. Polypetaly is more primitive than sympetaly.

17. Actinomorphic flowers are more primitive than zygomorphic flowers.

18. Hypogyny is the primitive condition, and from it perigyny and epigyny derived later.

19. Apocarpy (free carpels)is more primitive and from it syncarpy(fused carpels) has resulted.

20. Polycarpy (many carpels) precedes oligocarpy (few carpels) e.*g. Ranunculus* and *Nigella.*

21. The endospermic seed with small embryo is primitive than the non-endospermic seed with large embryo .e.g. *Ranunculaceae* and *Rosaceae.*

22. Indefinite stamens indicte greater primitiveness than an androecium with a few stamens only.(exception *Malvaceae*) e.g. *Ranunculus* and *Cheiranthus*.

23. Separate stamens precede connate stamens.

24. Aggregate fruits are more highly evolved than single fruits. Generally, capsule precedes berry and drupe.

Hutcinson has increased the number of ordes and families on account of more elaborate studies. He has included 411 families, whereas ***Bentham and Hooker's*** system has202 and ***Engler and Prantl***'s system has 280 families in their classifications.

Following is the brief outline of Hutchinson's system of classification:-

Phylum I ***Gymnospermae*** **(naked seeded plants)**

Phylum ***Angiospermae***

Subphylum (i) ***Dicotyledones***

Division I ***Lignosae*** (A fundamentally woody group, with some herbs derived from woody plants)

The ***Lignosae*** consists of 54 orders with 246 families. The first most primitive family is *Magnoliaceae* and the last one is *Verbenaceae,* which is treated as the most advanced one.

Division II ***Herbaceae*** (A fundamentally herbaceous group with a few shrubby plants derived from herbaceous ones). This division includes 28 orders with 63 families, beginning with Family *Ranunculaceae* , the most primitive and ending with the most advanced family *Labiatae.*

Subphylum (ii) ***Monocotyledones***

Group

(I) Calyciferae- Flowers with a distinct calyx and corolla. This group begins with the family *Butomaceae* and ends with the family *Marantaceae*

(***ii) Corolliferae***- Flowers with calyx and corolla more or less similar. This group begins with the family *Liliaceae* and ends with the family *Orchidaceae.*

(III) Glumiflorae – Flowers with much reduced perianth or represented by lodicules. This group begins with the family *Juncaceae* and ends with the family *Gramineae*, which includes grasses which are wind pollinated, a condition that is correlated with extreme reduction in flower.

Merits:

1. Hutchinson's system is a Phylogenetic one based on evolutionary trends which deals with the trends of evolution in all the parts of the plant.

2. Hutchinson has described 411 angiosperm families which is comparatively more than the earlier systematists. However, the number increased due to rearrangements also.

3. He has put Gymnosperms before Angiosperms, which is logical and true on the basis of evolution.

4. Dicotyledones has been placed before Monocotyledones. Dicots have been divided into two groups Lignosae and Herbaceae on the basis of habit. He has considered two different lines of evolution, one in the tree(arboreal) habit and the other with the herbaceous habit. His basic Phylogenetic principle i paralleled those of Bessey with certain exceptions.

5. He has included gross morphological characters along with anatomical as well as embryological parameters in his principles of classification, which seems logical.

Demerits:-

1. Though Hutchinson's system is Phylogenetic one , it could not be accepted universally due to certain controversies.

2. Hutchinson's fundamental principle that Dicots have evolved in two directions, one from herbaceous Ranales and the other from woody Magnoliales has not been adopted by many.

3. According to Benson (1957), Hutchinson's Phylogenetic studies gained populance for the brilliance of clarity **on hypothetical Phylogenetic concepts**. Hutchinson's system could not find an adoption till date (Lawrence, 1964) although revision of monocots has been accepted. Failure of explanatory notes on disposition of orders comprises reasons for non adoption of Hutchinson's system in certain quarters despite its merits.
