Topic – Contemporary System of Classification 1
Cronquist and Takhtajan

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Arthur Cronquist

Developed a comprehensive system of classification of angiosperms which deals particularly with the grouping of families into orders on a worldwise basis.

- Discussed a wide range of characters important to phylogenetic classification (provided keys to bring various taxa in accordance to this system, provided charts showing relationship of orders).
- Considered seed ferns (pteridosperms) as ancestors of angiosperms.
- His important phylogenetic ideas about angiosperms are as following:

1. The earliest angiosperms were shrubs rather than trees.
2. The simple entire leaf is primitive than compound leaf.
3. Reticulate venation is primitive than parallel venation.
4. Stems with scattered vascular bundles are advanced in comprasion to stems with bundles in a ring.
5. There is evolutionary decrease in activity and area of cambium.
6. Primitive flowers are large and terminal. Dichasial and monochasial types are basic units of inflorescence and other types of inflorescence are derived from these.
7. The primitive flowers had numerous whorls. Aggregation and reduction, elaboration and differentiation occurred during evolution.
8. Unisexual flowers are derived from bisexual flowers.
9. Entomophily is primitive than anemophily.
10. Axile placentation is ancestral and other types are derived from it.
11. Anatropous condition of ovules is primitive and other types are derived from it.
12. Unitegmic condition is advanced than bitegmic.
13. Polygonum type of embryo sac is primitive (8-nucleate) than 4-nucleate embryo sac.
14. The monocot embryos are derived from dicot ones.
15. Indehiscent fruits have evolved from dehiscent fruits and fleshy fruits from dry fruits.

- Book-**The Evolution and Classification of Flowering Plants**

An outline of his classification is as follows:

Division Magnoliophyta (Angiosperms)

Class1	Class 2
Magnoliopsida(Dicot)	**Liliopsida(Monocot)**
Subclass	Subclass
Magnoliidae	Alismatidae
Hamamelidae	Arecidae
Caryophyllidae	Commelinidae
Dilleniidae	Zingiberidae
Rosidae	Liliidae
Asteridae	
64 orders and 318 families	19 orders and 65 families

- The Magnoliidae were considered as the basal complex and the remaining subclasses were derived from it.
- The Asteridae is the most advanced group in magnoliopsida which includes gamopetalous families.
- Liliopsida were considered to have arisen from aquatic ancestors.
- Alismatidae includes aquatic forms whereas others inludes land plants.

Armen Takhtajan

He was inspired by evolutionary classification of flowering plants based on Darwinian philosophy. He considered angiosperms to be monophyletic and that they arose from some very ancient group of gymnosperms.

Takhtajan used the following criteria to evaluate the relative degree of advancement of flowering plants:

1. Growth habit- Woody plants are primitive than herbaceous growth habit.
2. Leaves- Simple leaves are primitive to compound. Parallel venation is the most advanced. Alternate leaf arrangement is most primitive and opposite type is derived from it
3. Inflorescence- Cymose is more primitive than racemose.
4. Floral structure- During the course of evolution due to progressive shortening of floral axis there was gradual transition to fixation of the number of floral parts.
5. Stomata- The general trend in stomatal evolution is from stomata with subsidiary cells to those lacking subsidiary cells.
6. Ovules- Unitegmic ovules arose from the bitegmic ones.
7. Pollination- Anemophily arose from entomophily although this is reversible.
8. Gametophyte and fertilization- Monosporic 8-nucleate Polygonum type is the most primitive. Tetrasporic is the most specialised. Porogamy is primitive and mesogamy and chalazogamy are derived.
9. Seeds- In advanced seeds the endosperm is reduced. The monocot embryo is evolved from dicot embryo. There is a gradual simplication of seed coat in many lines of evolution.
10. Fruit- Many seeded follicle is most primitive type and from this other types are evolved.

An outline of his classification is as follows:

Division Magnoliophyta (Angiospermae)

Class 1	Class 2
Magnoliopsida(Dicot)	**Liliopsida(Monocot)**
Subclass	Subclass
Magnoliidae	Alismatidae
Ranunculidae	Liliidae
Hamamelididae	Arecidae
Caryophyllidae	
Dilleniidae	
Rosidae	
Asteridae	
20 superorders	8 superorders

1. Among Magnoliopsida he considered Magnoliales as most primitive order of the flowering plants. But the order contains primitive features associated with some advanced ones(vegetative and reproductive structures).
2. Among Liliopsida the Alismatales also combine primitive features with advanced ones.
3. Alismatales have similarities with Nymphaeales placed in Magnoliopsida.
4. Takhtajan considers that Nymphaeales and Alismatales have a common origin from a hypothetical extinct terrestrial herbaceous group of Magnoliidae.

- His approach is very similar to that of Cronquist.
- Book-**The origin of Angiospermous plants.**