

S.Y.B.Sc. Botany CBCS Pattern
(Semester III, Paper I) 2020-2021

BO 231: Taxonomy of Angiosperms and Plant Ecology - 2
Credits (30 Lectures)

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2. Systems of classification 5L

Comparative account of various systems of classification

Artificial system- Carl Linnaeus

Natural system- Bentham and Hooker

Phylogenetic system- Engler and Prantl

APG system- A brief review

Comparative account of various systems of classification

Taxonomy is one of the oldest sciences aimed at developing a convenient method to classify and organize the diverse forms of living organism in an effort to understand the evolutionary relationships between them. Taxonomy reflects the totality of similarities and differences between groups of similar form.

The arrangement of plants into groups and subgroups is called as Classification

Classification arranges plants in a manner which gives an idea of sequence of their evolution. Some of these systems include **artificial system** of classification proposed by **Carolus Linnaeus**, **natural system** of classification proposed by **Bentham and Hooker** and **phylogenetic system** of classification proposed by **Engler and Prantl**.

Classification is grouping of an organism on the basis of similarities and differences. In plants there are thousands of different forms are reported so far.

On the basis of different criteria systems of classification are broadly differentiated in to following four types: For e.g. **Artificial system of classification**, **Natural system of classification**, **Phylogenetic system of classification** and **cladistic or molecular system of classification**.

From these classification systems, an artificial classification system has been put forward by **Linnaeus on the basis of number and nature of stamen and carpel**. Apart from Linnaeus classification system some other artificial classification systems are proposed by John ray, Theophrastus, Andrea Caesalpino, etc.

Natural classification system proposed by George Bentham and Joseph Dalton Hooker on the basis of all-important natural characters ie. morphological and reproductive characters. Other natural classification systems are proposed by Michel Adanson, Jean B. P. Lamarck, de Jessieu, de Candolle, Robert Brown, etc. Natural classification systems are having pre-Darwinian approach i.e. based on artificial characters, form relationships or morphological and reproductive characters

Phylogenetic classification systems are based on evolutionary history of plants and genetical tendencies among them.

Phylogenetic classification systems are having post Darwinian approach i.e. based on evolutionary history. For example: Engler and Prantl, John Hutchinson, Armen Takhtajan, Arthur Cronquist, Thorne, etc. Cladistic or molecular system of classification is based on molecular evidences i.e. analysis of the DNA sequences of three genes: one gene coding for ribosome.

Artificial System- carl Linnaeus: system of classification that does not consider affinities or relationship of the plants with one another is called "Artificial system". Out of these artificial systems, the sexual system of classification given by **Carolus Von Linnaeus** is the most accepted artificial system of classification. He was a Swedish biologist, physician and zoologist. On account of his remarkable work, **Linnaeus is rightly called the father of modern taxonomy and ecology.**

According to this system, the plants are classified on the basis of readily observed or only few characters of plants. It does not take into account affinities or relationship of plants with one another. Carl Linnaeus (1707-1778) contributed to the most popular system of classification in eighteenth century. He also contributed significantly in the classification and nomenclature of plants. Hence, he is rightly called as '**Father of Taxonomy**' or 'Father of Modern Botany'. His artificial sexual system of classification is mainly based on the morphological arrangement, length and number of stamens in the flowers. His system was based on differences rather than the similarities of sex organs.

Linnaeus created a binomial system of naming plants and animals whereby each species of plant and animal is given a generic name followed by a specific name (species), with both names being in Latin. This system is called as binomial nomenclature

. In 1929, he published his first paper on sexuality of plants, when he was working as a student in the University of Uppsala. He wrote many important books like **Genera Plantarum**, **Species Plantarum**, **Flora Lapponica**, etc. He published the outline of famous classes book of plants **Genera in Plantarum** his book (1937), **Systema Naturae** in 1735. In his described 935 genera and arranged them systematically. He noted the constancy the number of stamens. He published book **Species Plantarum** (1753)about 6000 species in 1000 genera.

Linnaeus classified the plants on the basis of floral chracters under 24 classes.He completely neglected the vegetative characters

The character used for classification.

1. No. of stamens
2. Insertion of floral parts into the thalamus

3. Arrangement, adhesion and distribution of stamen

4. Nature of anther and filament and their arrangement

24 classes. = 23 flowering plants

24th is Algae, Fungi, Bryophytes, pteridophytes

Class 1 - Monandria - Flowers having one stamen. Ex. - Lemna, Scirpus.

Class 2 - Diandria - Flowers having two stamens. Ex. - Salvia, Veronia.

Class 3 - Triandria - Flowers having three stamens. Ex. - Iris, grasses.

Class 4 - Tetrandria - Flowers having four stamens. Ex. - Mentha, Ulmus, Cornus.

Class 5 - Pentandria - Flowers having five stamens.
Ex. - Primula, Myosotis, Ipomoea.

Class 6 - Hexandria - Flowers having six stamens. Ex. - Rumex, Berberis, Alisma.

Class 7 - Heptandria - Flowers having seven stamens. Ex. - Aesculus.

Class 8 - Octandria - Flowers having eight stamens. Ex. - Fagopyrum.

Class 9 - Enneandria - Flowers having nine stamens. Rheum

Class 10 - Decandria - stamens 10.,

Ex. - Acer, Kalmia, Oxalis.

Class 11 - Dodecandria - Flowers 11-19 - stamen

Euphorbia, Calla.

Class 12 - Icosandria Flowers having more than twenty attached to - sepals. stamens Ex. - Rosa, Rubus.

Class 13 - Polyandria Flowers having more than twenty stamens attached to - the receptacle Ex. - Tilia, Nymphaea.

Class 14- Didynamia petals. Flowers having 2 long and 2 short stamens attached to - Ex. - Linaria, Ocimum.

Class 15- Tetradynamia - Flowers having six stamens of which 4 are long and 2 are short. Ex. - Brassica.

Class 16 - Monadelphica - Flowers having stamens united by filaments to form single bundle. Ex. - Hibiscus.

Class 17 - Diadelphica - Flowers having stamens in two bundles. Ex. - Clitoria, Pea.

Class 18 - Polyadelphica - Flowers having stamens in more than two bundles.

Ex. - Bombax, Hypericum ..

Class 19 - Syngenesia - Flowers with stamens attached by anther lobes and filaments free and epipetalous i.e. syngenesious.

Ex. - Helianthus, Lobelia.

Class 20 - Gynandria- Flowers with stamens attached to gynoecium. Ex. - Calotropis, Aristolochia.

Class 21 - Monoecia - Flowers are unisexual, developed on the same plant - (i.e. male and female flowers on the same plant).

Ex. - Typha, Flowers Caster, are Coccinia.

Class 22 - Dioecia – plants unisexual and develop on different. (i.e. male and female plants are separate).

Ex. - Salix. **Class 23 - Polygamia** - Male or female plant; bisexual flowers develop on same plant.

Ex. - Mango, Sapindus. plants.

Class 24 - Cryptogamia - Non flowering Reproductive structures absent

Algae, concealed. Fungi, Bryophytes Pteridophytes was Linnaeus's -system. in use for and about. 7 decades

Merits of Artificial System of Classification:

Identification is made easy.

Poorly known plants are placed in one of the classes.

Even with the expansion of our knowledge this system still remains the most stable and accepted system of classification.

Limitations of Artificial System of Classification

Plants having phylogenetic similarity are placed in different groups.

It gives limited information about plant members.

This system has little or no predictive value.

- Other Examples of Artificial System of Classification:
- Theophrastus (370-287 B.C.) - He classified plants on the basis of habit into herbs, under shrubs, shrubs and trees. He is known as the 'Father of Botany'.
- Andrea Caesalpino (1519-1603) - He classified plants into two major groups on the basis of habit into woody and herbaceous plants.
- John Ray (1627-1705) - He classified plants into two major groups i.e. herbs and arbores.



Thank You