

## CLASSIFICATION SYSTEMS

There are three primary systems of classification: artificial, natural, and phylogenetic.

### Artificial System of Classification:

- Basis: The earliest classification systems were artificial and relied on one or a few morphological characters for grouping organisms. For instance, the classification within angiosperms was based solely on gross superficial morphological characters like habit, color, number, and shape of leaves. These systems focused mainly on vegetative characters or the androecium structure (Linnaeus's system).
- Proponents: Scientists who contributed to the artificial system include Aristotle and Linnaeus.
- Drawbacks: These systems separated closely related species as they were based on a limited number of characteristics. Equal weightage to vegetative and sexual characteristics was given, which was not acceptable due to the influence of environmental factors on vegetative characters. To overcome these drawbacks, the natural classification system was developed.

### Natural System of Classification:

- Basis: Organisms in this system are classified based on natural affinities, considering not only external but also internal features such as ultrastructure, anatomy, embryology, and phytochemistry.
- Proponents: George Bentham and Joseph Dalton Hooker developed a natural classification system for angiosperms.

### Phylogenetic System of Classification:

- Basis: Phylogenetic classification systems, currently accepted, are based on evolutionary relationships between organisms, assuming that organisms within the same taxa share a common ancestor. Fossils play a crucial role in elucidating these evolutionary relationships.
- Proponents: Engler and Prantl, Hutchinson, Takhtajan are notable contributors to the phylogenetic system. Information from various sources is now utilized to resolve difficulties in classification, particularly when there is no supporting fossil evidence.

**BRANCHES OF TAXONOMY**

**Numerical Taxonomy (Phenetics):** Numerical Taxonomy, also known as Phenetics, employs numerical methods to assess the similarities and differences between species, facilitated by computer analysis.

Steps involved in numerical taxonomy:

- Numbers and codes are assigned to all observable characters, such as plus (+), minus (-), and data not available (0).
- Computers compare all possible characters, assigning equal importance to each.
- The organization and analysis of data form the core of this taxonomy.

One significant advantage of this taxonomic method is its ability to consider hundreds of characters simultaneously.

**Cytotaxonomy/Karyotaxonomy:** Cytotaxonomy or Karyotaxonomy is based on cytological information, including chromosome number, structure, and behavior.

**Chemotaxonomy:** Chemotaxonomy relies on the chemical constituents of plants. Scientists use information such as DNA sequences, the chemical nature of proteins, crystals (e.g., calcium oxalate or calcium carbonate), and aromatic compounds to address classification ambiguities.