

TAXONOMIC HIERARCHY

Linnaeus was the first taxonomist to establish a definite hierarchy of taxonomic categories hierarchy recognised within the animal kingdom. The main aim of taxonomic study is to assign organisms an appropriate place in a systematic framework of classification. This framework is called taxonomic hierarchy by which the taxonomic groups are arranged in definite order, from higher to lower categories. There are seven major category. The most inclusive category is kingdom, other major categories, in descending order are **Phylum, class, order, family, genus, and species**. The botanist use division in place of phylum as a category in the classification of plant kingdom. These categories are called obligate categories.

Monophyletic and polyphyletic taxa. A taxon that includes a common ancestral species and all the species are descended from it is called a monophyletic. Many taxa in use today include organism evolved from many sources but not their common ancestor, if any. Such taxa are said to be polyphyletic. A polyphyletic is also called a **grade**. Actually, many taxa are based on morphology and are polyphyletic.

Obligate categories-

Species -occupies a key position in classification. It is the lowest taxonomic. Category. Classifying a group of species, naming them and understanding their evolutionary relationships is called revision of the group. In this criteria for distinguishing the given species. The best criteria is free interbreeding of individuals.

The concept of species needs elaboration because it has greatly changed in the light of modern biological discoveries. Each of the 1.7-1.8 million kinds of organisms known at present is regarded a species. All

mango plants likewise form a separate species, and so do all the rose plants.

Genetics has revealed that the concept of species has much greater significance in biology than its role as a unit in classification. This significance lies in the fact that the members of a species breed only with others of their own species.

• Mayr (1964) has defined "A species is a group of actually or potentially in breeding populations that are reproductively isolated from other such groups"

Sexual reproduction, a key point in the definition of a species may produce offspring different from the parent due to mutation. This shows that the species may change with time. Thus, species are really dynamic groups

A species may have subgroups, called **subspecies** or **varieties**, showing certain distinct features of their own.

Genus - A genus is a taxonomic category containing a single species, or a monophyletic group of species, which is separated from other taxa of the same rank by a decided gap. In other words a genus is a group of related species which resembles one another in certain correlated characters. Correlated characters are those similar or common features which are used in delimitation of various taxa. The species of one genus differ from species or a related genus in one or more characters. All the species of genus are thought to have involved from a common ancestors. It is not essential for a genus to have several species for example *Solanum* has a large number of closely related species such as

Solanum tuberosum, or *S. melongena*, *S. nigrum* are closely related species have been included in the genus *Solanum*.

Family – a family is a taxonomic category containing a single genus or a monophyletic group of genera, which is separated from other families by a decided gap all the genera of a family have some common features. They are separable from genera of a related family by important characteristic difference. The family **Solanaceae** includes a number of genera like *Solanum*, *Petunia*, *Atropa* due to similarities. They are distinct from the genera of related families.

Order- This category includes one or more family a resembling one another in a few characters. These characters are less similar as compared to many genera put in a family. Families such as **Solanaceae** and **Convolvulaceae** are put in the order **Polemoniales** on the basis of some related floral characters.

Class –A class is made of one or more related orders. For example, the class dicotyledoneae of flowering plant includes all dicots which are grouped into several orders Roseales, Passiflorales, etc.

Phylum or division –This is a category higher than that of class. The term phylum is used for animals while division is used for plants. A phylum or division comprises one or more classes for example in plants, division spermatophyte has seven classes of gymnosperm and two classes of angiosperm.

Kingdom -Kingdom is the highest taxonomic category. It is a group of phyla / divisions which have certain common characteristics..All phyla of the animals lack cell wall and chlorophyll and are placed in the Animalia, and all plants have rigid cell wall are in kingdom plantae.