Botanical Nomenclature

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- **Botanical nomenclature deals with the determination or application of a correct name to a plant or taxon**.

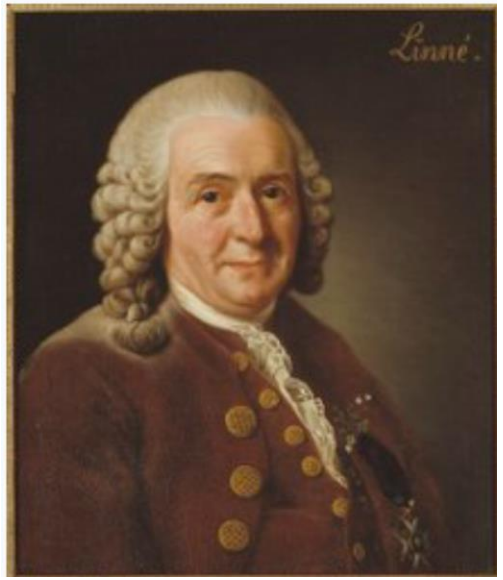
- **The system of naming plants on scientific basis is known as plant nomenclature.**

- The earliest scientific names of plants were **polynomials** i.e., they were composed of several words which gave more or less a complete description of a plant. Eg. Pulkonat gave the scientific name of a plant which we now know as *Sida acuta* as "*Chrysophyllum foliis ovalis, superne glabris, parallele striates, subtus tomentosonitidis*".Such long names were difficult to remember and therefore discarded.

Binomial System of Nomenclature

- **Linnaeus** first used the binomial System of Nomenclature in first edition of his book - ***Species Plantarum*** published in 1753.

Carl Linnaeus



According to binomial system of nomenclature –

- ❑ Name of a plant consist of two **latin** or **latinised** words.
- ❑ The first word called '**generic epithet**' represents the **Genus**.
- ❑ The second word called '**specific epithet**' represents the **species**.
- ❑ Eg., Botanical name of mango is ***Mangifera indica***. *Mangifera* is the genus and *indica* is the name of species.
- ❑ Scientific names are printed in **italics** (underlined when hand written).
- ❑ Generic name starts with capital letter and specific name with small letter.
- ❑ There is only one scientific name of a plant which is the legitimate name.

Taxonomic Hierarchy (Taxa and their rank)

- Different groups of plants classified for taxonomic purpose are called **taxa**.
- Every individual plant is treated as belonging to a number of categories (taxa) of consecutively subordinate rank, among which the rank of species is basic.

The principal ranks of **taxa** in descending order are:

- **Kingdom**
- **Division**
- **Class**
- **Order**
- **Family**
- **Genus**
- **Species**

Features of Taxonomic Hierarchy

- Name of taxa above the rank of family is treated as plural name and is written with an initial capital letter.
- Such names are generally based on the name of an included genus called the **type genus**.
- Each rank has a distinctive ending that is attached to the stem of the type genus. Suffixes used to form these names are:

  aceae for family (eg. magnoliaceae)

  ales for order (eg. magnoliales)

  psida for class (eg. magnoliopsida)

  phyta for division (eg. magnoliophyta)

- Names of genera are treated as nouns in the nominative singular, underlined (or italicised) and it starts with the capital letter.
- The scientific name of species is binary combination of the name of the genus followed by the specific epithet.
- The specific epithet is usually considered to be an adjective; it is also italicized or underlined and written in all over case.
- To be complete, the scientific names include **authority or author's name** (name of the person who described the species). The authors name is never italicized or underlined. To save the space, authors name is generally abbreviated for example- **L.** or **Linn.** for Linnaeus.

International Code of Botanical Nomenclature

- The International code of botanical nomenclature is a set of rules on the basis of which plants are given their botanical names (scientific names).
- The code specifies the standards and forms of names to be applied to each taxa of plants.
- Foundations of International code of botanical nomenclature are found in **Linnaeus** '***Philosophia Botanica***' published in 1751 wherein he proposed certain principles of nomenclature.
- Another significant work on plant nomenclature was **Augustine de Candolle's** ***Theorie Elimentaire de la botanique*** (1813). It give detailed rules on plant nomenclature.
- However, the first organised efforts to develop a precise and simple system of nomenclature to be used by botanists in all countries were made at the **First International Botanical Congress** held in **1867** in **Paris**.
- At this congress the **Regles de la nomenclature botanique** (Laws of Botanical nomenclature) as proposed by Alphonse de Candolle (son of Augustine de Candolle) were adopted with some modifications. These rules are known as **Candolle rules or Paris code of 1867**.

Augustin Pyramus de Candolle

Alphonse Pyramus de Candolle

International Botanical Congresses and code

- **Rochester code** (1892); **Vienna code** (1905); **American code** (1907) ; **Brussel's code** (1912); **Cambridge code** (1930); **Amsterdam code** (1947); **Stockholm code** (1952); **Paris code** (1956) etc.
- 17th edition of International code of botanical nomenclature (**ICBN**) was held in Vienna in 2005.
- 19th International Botanical Congress was held in Shenzhen (China) in July 2017.
- **XXth International Botanical Congress** was to be held in Rio de Janerio (Brazil) in 2023 but has been postponed due to covid pandemic. It is now scheduled at **Madrid (Spain) in 2024**.

Important features of ICBN (Vienna, 2005)

- The code is divided into **three** divisions:
- **Division I - Principles**
- **Division II - Rules and recommendations** ; further divided into **7 chapters** and **sections** (**Article 1 to 62**).
- **Division III - Provisions for the governance of the code.**

In addition there are five appendices in the code.

Appendix I - Names of Hybrids

Appendix II A – Conserved and rejected family names of fungi, pteridophytes and fossils

Appendix II B - Conserved family names of bryophytes and spermatophytes.

Appendix III A – Conserved and rejected generic names.

Appendix III B – Conserved and rejected specific names.

Appendix IV – Rejected names and all combinations based on these names.

Appendix V- List of publications and the category of taxa that are not validly published.

Division I - Principles

The principles form the basis of botanical nomenclature. There are **six** principles.

1. Botanical nomenclature is **independent** of zoological and bacteriological nomenclature.
2. Application of names of taxa is determined by **nomenclature types**.
3. Nomenclature of taxonomic groups is based on **priority of publication.**
4. Each taxonomic group can bear only **one** correct name.
5. Scientific names of taxonomic groups are treated as **Latin**.
6. Rules of nomenclature are **retroactive** (taking effect from a date in the past) unless expressly limited.

Division II - Rules

Rules give detailed prescriptions on all points connected with the naming of plants.

[I] Rank of taxa- The word taxa signifies taxonomic group of any rank.

[II] Typification – The nomenclature type is that element with which the name is permanently associated. Following terms are used in the nomenclature of types:

Holotype- designated by author as the nomenclature type i.e., used by author for plant description.

Isotype- Besides the holotype the author has prepared several other say 1,2,3,4…duplicate sheets of herbarium. But the other sheets have not been used for plant description.

Syntype- The author has prepared several sheets but has not designated any holotype i.e., not mentioned the sheet used for plant description. In this case, any one of the several sheets is designated as the holotype and the remaining are called syntypes.

Paratype- During publication if the author says that he has used one sheet as holotype but also mentions that he has also used the other sheet for plant description, then the other sheet is called the paratype.

Lectotype- If the holotype is missing or the author did not designate the holotype and only syntype/isotype/paratype exist. So, out of these one is selected as a type, and is called the lectotype.

Neotype- specimen or element selected to serve as nomenclature type as long as all the material on which description of species was based is missing.

Topotype- A specimen of a plant collected from the **same locality** as the holotype and usually on a different date.

Epitype- It is a specimen or illustration to serve as nomenclature type when the holotype, lectotype or neotype or all original material associated with validly published name is demonstrably ambigious.

[III] Priority

Each taxon can bear only one correct name.

Correct name is the earliest legitimate one (except in limitation of priority by conservation).

[IV] Name of families

Name of family is a plural adjective used as a substantive(having independent existence).

It is formed by adding the suffix '**aceae**' to the stem of the name of a genus e.g., Rosaceae (from *Rosa*), Cucurbitaceae (from *Cucurbita*).

[V] Name of genera

Name of a genus is singular number and is substantive(having independent existence).

It should not contain two words unless joined by hyphen.

[VI] Name of species

A species is a a population or group of organisms that can interbreed with one another to produce fertile off springs.

The name of a species is a **binary combination** consisting of the name of the genus followed by specific epithet. Species name begins with **small letter**. Species name may based on **specific character**, name of any **scientist** or **place**.

[VII] **Name of infraspecific taxa**

Sometimes species population are different from normal species and still they belong to the same species.

This variation is expressed as infraspecific category.

It is called a subspecies (abbreviated as subsp. Or ssp. But never spp.*

(*spp implies 2 or more species)

[VIII] **Name of plants in cultivation** Plants brought from the wild into cultivation retain their original names.

[IX] **Conditions of effective and valid publication**

According to code, publications of new names and descriptions are effective when the printed matter is distributed to the general public or at least ten botanical institutions with libraries accessible to botanists.

[X] **Author citation** A scientific name should be accompanied by the name of author or authors who first published the valid name. Author's name are generally abbreviated. E.g., *Argemone mexicana* Linn.

Berberis asiataca Roxb.ex DC (legitimate name proposed by one author, published validly by another author).

Leucas nutans (Roth.) Spreng. (author who gave the specific epithet is placed in parenthesis and who made the change is mentioned outside.

[XI] **Retention of names of taxa which are divided**

When a genus is divided into two or more genera, the original generic name must be retained for the genus including the type species. E.g., *Lychnis dioca* L. was divided by Miller into two species, the first which contained the type was named *Lychnis dioca* L. emend Mill. and the other *L. alba* Mill.

[XII] **Change in names of taxa on transference** When a subdivision of a genus is transferred to another genus without change of rank, its original name must be retained. E.g., *Saponaria* sect. *vaccaria* DC. when transferred to *Gypsophila* becomes *Gypsophila* sect. *vaccaria* (DC) Godr.

When two or more taxa of the same rank are united into one, the oldest legitimate name is retained for the combined taxon.

[XIII] **Names of different taxa** The pattern of naming different taxa should be as follows:

Genera **monomials**; species **binomials** and subspecies **trinomials**

MELBOURNE CODE (2011)

- The Vienna code was adopted by 18th International Congress held at Melbourne in 2011.
- **ICBN** (International Code of Botanical Nomenclature) was changed to **ICN** (**International Code of Nomenclature for Algae, Fungi and Plants**).
- Electronic publication of all nomenclatural acts permitted from 1st January, 2012.
- For names published on or after 1st January, 2012, the description and/or diagnosis must be either in English or latin.
- **One fungus-one name** Earlier the code permitted separate names for sexual and asexual phases of those fungi whose life-history involved morphological expressions so different that it was commonly impossible to link them to one another. Molecular studies have changed the situation and so asexual phase (the **anamorph**) and sexual phase (the **teleomorph**) are being increasingly identified. Thus, in place of separate names for anamorph and teleomorph, the concept of one name for one fungus is upheld. Currently, the name applied to the whole fungus (the **holomorph**) has to be one that is based on a teleomorphic element.

SHENZHEN CODE (2018)

- Framework for registration of new names and nomenclature for algae and plants.
- Expanded Division III on governance of code.
- Mycologists use same rules for naming of fungi as do botanists and phycologist for plants and algae.

NAMING OF CULTIVARS

- Cultivars means cultivated variety.
- Cultivars were earlier described in latin but now have names in any modern language.
- Cultivar names are never italicized.
- Cultivar names is designated by single quotation marks.
- Example : Earlier *Potentilla fructicosa* Cv. Tangerine

  Now *Potentilla fructicosa* Cv. 'Tangerine'

Hybrids: E.g., *Camella japonica* x *Camella saluenensis*

Graft-Hybrid: E.g., +*Crataegomespilus dardarii* arose as a graft chimera when *Mespilus germanica* was grafted onto *Crataegus monogyna.*

International Code of Nomenclature for cultivated plants (ICNCP 1980, 1985)

- This code is simpler, shorter and independent of the ICBN code.
- Cultivars names must be written in roman case with single inverted comma.
- Specific epithet may be dropped in genera with complex or unknown ancestry.
- Cultivar name after 1 January, 1959 must **not** be in latin.
- Names of cultivar cannot be common descriptive words or phrases for eg. Large, large white etc.
- Names of cultivar should not be translated in different languages.

Common (vernacular names)

- No rules governing the usage of common names.
- Normally initial letter not capitalised.
- Never italicized.
- Can be combined with a cultivar name.
- A hyphen is included when part of the plant name does not correctly reflect the botanical classification of plants. E.g., rock-rose is not a rose.

References

- B.Sc. Semester III Botany by Singh, Pande and Jain
- B.Sc. Semester III Botany by B.P.Pande
- B.Sc. Semester III Botany - Krishna Publication