

BOTANICAL Nomenclature

Introduction

Nomenclature = the application or assignment of names. A major component of plant taxonomy.

Names provide a cultural or symbolic link to reality and formal scientific names for flowering plants allow a connection to biological reality as expressed by complex systems of classification, i.e., scientific names provide a stable 'handle' and are also rich in **information content**.

The Magnoliophyta is distributed world-wide as a complex network of ca. 250,000 species. Plant Science is active on a world-wide basis - Chinese physiologists, German ecologists, American Agronomists, British Horticulturists are all working with plant material that can be identified, using the products of plant systematics, to a given species or infraspecific element. If scientific work is to be repeatable and communicated on a global basis, each species has to be associated with a symbol (species epithet) that is unique, standardized and, via the Genus name, intercalated into the full, content-rich system of botanical classification.

Nomenclature is the science of naming objects or organisms. The names are important because they establish identity of objects or organisms. They are useful in communication. For example, when we mention the name Sunflower we are able to communicate important information about the plant and its flower. The names enable us to compare things and tell about their relationship. The science of naming plants is called 'Botanical Nomenclature'. Botanical nomenclature is the naming of plants and the related principles and rules

There is a difference in names of plants and where as each human being has a separate individual name such as Deepika, Amrit etc. Plants are known by collective name for example Brinjal is a collective name for all Brinjal plants. Each Brinjal plant is not individually named. Plants occurring in particular regions carry names in local languages. These names in local languages are not likely to be known to outsiders. The science of botany transcends all geographical barriers. Botanists working in different parts of the world must share botanical information as well as plant materials. Common names of plants in regional languages can be a major obstacle in this endeavour. There is thus a need for giving scientific names to plants, the names that are universally understood and accepted. Botanical nomenclature.

Solutions have come about through cooperative development of an international system of plant nomenclature - brief history:

1) **Carolus Linnaeus** (overview from UC Berkeley) - initiated a standardized system in the mid-1700s and published *SPECIES PLANTARUM* (1753) which standardized the binomial as a replacement for descriptive names or polynomials:

before Linnaeus: *Eupatorium cannabinum, foliis in caule ad genicula ternis, floribus parvis, umbellatim in summis caulibus dispositis, Marilandicum*

after Linnaeus: *Eupatorium purpureum*

2) Augustin Pyramus de Candolle made first attempt at an international code of nomenclature (early 1800s)

3) two codes existed in the late 1800s and early 1900s - American vs. European. Aspects of these were argued during international botanical congresses of 1892 and 1910.

4) 1930 - first **International Code of Botanical Nomenclature** (ICBN)

5) subsequent international botanical congresses (ca. every 4-6 years) hear proposals to modify the Code - the most recent congress was in St. Louis, Missouri, USA

6) each edition of the ICBN is published in English, French and German - the most recent (2005 - Vienna Code)

7) provisions of the ICBN are divided into Rules (firm or binding), set out in the Articles, and Recommendations (non-binding - suggestions)

What is scientific name?

A name is merely a conventional symbol or cipher that serves as a means of reference and avoid the need for continue use of a cumbersome descriptive phrase .The fundamental principle of scientific nomenclature is that names must be unambiguous and universal . The formation and use of scientific names of organism for nomenclatural purposes are governed by codes of nomenclature Comparison between Scientific names and Common (vernacular) names

Botanical names are universal while common names are limited to a single language or to a particular geographical region

Sometime one vernacular name may be used to different taxa or one taxon may have different common names e.g. Mufu is a swahili name for about 30 species of section Solanum . Common names may be misleading e.g. “Nyanya chungci’ is not “common tomatoes”. But Solanum aethiopicum while common tomato is Solanum Lycopersicon .There are no eggs in egg plant = Solanum melongana

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Polynomials:

The early scientific names were clumsy and unwieldy. They consisted of many words and were called polynomials such as *Lychnis alpina linifolia, multiflora, perample radicle*. This name was applied to *Lychnis* growing in mountains (alpine) and having flax like leaves (linifolia), many flowers (multiflora) and large root (perample radicle) *Caryophyllum saxatilis .folus ,qrumineus umbelltus corymbis* is another example of polynomial. It means *caryophyllum* grows on rocks. It has grass-like leaves and umbellate corymb inflorescence. These names are inconvenient to use and difficult to remember because they are very lengthy. It may be mentioned that many botanists including C. Linnaeus used polynomials but they felt a need to replace polynomials by scientific names which were short and meaningful.

5.2 Binomial nomenclature

Binomials-

Bauhin conceived the idea of binomials, i.e. the two word names, however, the binomial nomenclature was popularized and made widely acceptable among botanists by C. Linnaeus who is called father of taxonomy. According to binomial system of naming the name of plant must consist of two components viz the generic name and the specific epithet. Linnaeus gave elaborate discussion of the Binomial system in his *Species Plantarum* published in 1753. The date of publication of *Specied Plantarum* for all practical purposes is regarded as the starting point of Binomial System of naming plants. The *Species Plantarum* included names of 1098 genera and 5900 species .

Advantages of using binomial names in place of common names

- (i) The binomial names are universal where as common names vary from language to language.
- (ii) The binomial names furnish information about the genetic relationship. All species included in a genus are closely related genetically. The common names do not provide any such information.
- (iii) An economically important plant or a plant well known for any other reason may carry many names or the same common name may be assigned to different kinds of plants. The common name pine is used for such different genera as *Pinus*, *Araucaria*, *Agathis* *Callitris*. *Casuarina*. The name oak is associated with the genus *Quercus* but the tanbark oak is *Lithocarpus*, poison oak is *Rhus*. The name mahogany is assigned to hundreds of different kinds of plants, The name 'flame of the forest ' is assigned to both *Erythrina indica* and *Butea monosperma*.

(iv) Many plants particularly wild do not have common names. such plants are given binomial names

ICBN Principles International code of Botanical Nomenclature

Known as ICN (International Code of Nomenclature) Name changed in Melbourne Code Australia

(ICBN) Principles of Botanical Nomenclature

❑ The naming of plants is covered by the ICBN ❑ New edition of ICBN is published after each International Botanical Congress, referred to by the city where the Congress took place. o The most current is Shenzhen code of 2018 ❑ Application of names is determined by nomenclatural types ❑ Nomenclature is based upon priority of publication

The publication of Linnaeus' Species Plantarum(1753) is accepted as the starting point for scientific nomenclature of plants. Linnaeus published some elementary rules for scientific naming of plants in his book Philosophica Botanica [-after Augustin, deCandolle and his son Alphonso deCandolle, added rules to those proposed by Linnaeus. The first International botanical Congress was convened by Alphonso de Candolle in Paris (1867)' It was attended by botanists from many countries.

A set of rules for naming plants scientifically was adopted and is known as Paris code (1867). Addition to rules were made in the meetings of subsequent International Botanical Congresses in 1892, 1905, 1907 and 1910. However, it was in the International Botanical Congress held in Cambridge. (1930) that the botanists all over the world agreed to have a uniform code for naming plants. The code was called International Code of Botanical Nomenclature'

Botanists periodically meet at International Botanical congresses to discuss nomenclatural rules. During these meetings new rules are adopted and the existing ones are modified and amended

The ICBN has three components viz., Principles, Rules and Recommendations- It is divided into three chapters.

chapter one - general considerations and guiding principles

chapter two-contains four articles specifying categories of taxa and terms denoting them.

chapter three - entitled names of taxa contains 15 sections which deals with major portion of rules

(i) Principles-

The principles constitute the philosophical framework of the ICBN. They are given below-

PRINCIPLES:

1. "Botanical nomenclature is independent from zoological nomenclature"
2. The application of names of taxonomic groups is determined by means of nomenclatural types"

Each species has a nomenclatural type specimen, each genus has a species that serves as nomenclatural type, each family has a type genus, etc. THUS, the rank of species is the keystone of the nomenclatural system, i.e., the entire hierarchical structure is based on the **species** and its **type specimen** because this is the only physical link between the nomenclatural system - a cultural or symbolic construct - and biological reality.

TYPE METHOD: Each species epithet is applied to a specific dried herbarium specimen - this represents the

holotype = type designated by the authority,

isotype = duplicate of the HOLOTYPE,

lectotype = type specimen designated by a later worker.

This specimen is the nomenclatural type - a legalistic device, has nothing to do with the biology of the taxon. A given species is designated as nomenclatural type of a genus, a given genus is designated as nomenclatural type for the family. All changes in nomenclature resulting in taxonomic decisions concerning changes in RANK or circumscription require examination of the type specimen. These specimens are of special interest and, as a result, are often receive special treatment by herbarium curators. See type specimen

3. "The nomenclature of a taxonomic group is based upon the **priority of publication**".
principle of priority: Example - What happens when three species are combined into a single unit (lumping):

Cannabis sativa L. 1753

C. indica Lam. (Jean Lamarck - 1744-1829) 1785

C. ruderalis Janischevsky 1924

EARLIEST name is retained - *C. sativa* L. How far back do we go?
For vascular plants: Linnaeus' *species plantarum* 1753 (MAY 1)

Requirements of the code for **valid** publication:

1. designation of a name
2. description (native language) and diagnosis (latin)
3. designation of a type:

Vernonia cronquistii S. B. Jones, sp. nov. TYPE: Cronquist 9705 (Holotype NY!, Isotypes: GH!; MEX!). [**INDEX HERBARIORUM**]

"Effective" publication = how published

4. "Each taxonomic group with a particular circumscription, position, and rank can bear only one correct name, the earliest that is in accordance with the rules, except in specified cases"

EXCEPTIONS = "CONSERVED" (for various reasons) names - at the Family level:

- **Palmae - Arecaceae**
- **Gramineae - Poaceae**
- **Cruciferae - Brassicaceae**
- **Leguminosae - Fabaceae**
- **Guttiferae - Clusiaceae**
- **Umbelliferae - Apiaceae**
- **Labiatae - Lamiaceae**
- **Compositae - Asteraceae**

5. "Scientific names of taxonomic groups are treated as Latin regardless of the derivation"

BINOMIAL: (species name) = COMPLETE SCIENTIFIC NAME

1. genus name - Singular, Latinized noun [or a word treated as a noun], always capitalized, often abbreviated [once written a single time], can be taken from any source - ***Marshall johnstonia*** (information on genera - see Mabberley, D. J. 1997. ***The Plant-Book*** - copies in lab)

2. species epithet - can be derived from any source, often an adjective, descriptive Latinized - (capitalization) - usually agrees in gender with the genus name

3. authority - full or abbreviated name = historical information. Who is the authority - see listings in Correll and Johnston, Manual of the Vascular Plants of Texas, M. F. Fernald 1956. Manual of Botany or an online index from Harvard University. When and where was the name published? Indices are maintained as name references. These include the **Gray Card Index** (Harvard University) for New World taxa, and also ***Index Kewensis*** (Royal Botanic Garden, Kew) with worldwide coverage, and a new combined version on line - the **International Plant Name Index**. **Parenthetical authorities** denote a change with retention of linkage to the individual (authority or author) responsible for the name:

change in rank - Smith does a study of the *Vernonia cronquistii* complex and discovers that plants assignable to *V. cronquistii* are closely related to *V. alba* - so: *Vernonia alba* L. ssp. *cronquistii* (S. B. Jones) Smith

change in circumscription White discovers that plants assignable to *V. cronquistii* are distinct from other *Vernonia* species, maybe with regard to chromosome number or gene

sequences, and quite similar to species of *Taraxacum* - so - *Taraxacum cronquistii* (S. B. Jones) White

6. "all rules are retroactive unless expressly limited"

Rules of nomenclature

Codes of Nomenclature Principles and rules of Botanical nomenclature are developed and adapted in series of International Botanical congresses

Principles and rules are listed in International Code of Botanical Nomenclature (ICBN)

The main goal of ICBN is to provide one correct name for each taxonomic group within a stable system of names or classification

International Code of Botanical nomenclature (ICBN) for Plants (including Fungi and Cyanobacteria)

International Code for Nomenclature of Cultivated plants (ICNCP) only for cultivated plants

International Code of Zoological Nomenclature (ICZN) for Animals

International Code of Nomenclature of Bacteria (ICNB) - for Bacteria

International Committee on Taxonomy of Viruses (ICTV) for Viruses

The main points of Binomial System are given below:- Characteristics of Species scientific names

a) Species Scientific names are binomials (composed of two words i.e. generic and species)

b) Binomial system was founded by Jean Bauhin but used consistently first by Linnaeus in *Species plantarum* (1753)

c) The first word of a species name is of a Genus to which the plant belongs and the second word is of a species

d) A generic name is a 'collective name' for a group of plants that all share similar characteristics.

e) The specific name, allows us to distinguish between different plants within a genus.

There are over 2000 *Solanum* species in the genus *Solanum* differentiated by specific names

Writing a botanical name and the protologue

The specific epithet may be followed by one or more Authorities

Authority is a name or names of a person or persons who first described the species

Solanum americanum Miller (Miller = Mill.)

The protologue is the ensemble of all the elements associated with the original publication of a taxon name

Solanum americanum Miller, The Gardeners Dictionary, Ed. 8, art. Solanum no.5 (1768). 'Type: Cult.

Chelsea Physic Garden, origin Virginia, Miller s.n.(Holotype BM!) ,

Coining of generic name and specific epithets

LATIN DIAGNOSIS-

Mainly Latin words were used in coining the binomials because Latin was popular language of the scholars of Europe in those days. It may be mentioned that many botanists including Linnaeus coined binomials by using Greek words also. Rules of botanical nomenclature, now allow use of words from any language in making botanical names provided they are Latinized. The gender of the specific epithet should agree with that of the generic name. In Latin, three genders namely masculine, feminine and neuter are recognized some examples of which are mentioned here.

Masculine(Usually ending in - us) –

Fagus, Populus, Myrtus, Phyllanthus, Platanus

Feminine(Usually ending in- a) –

Portulaca, Ravenala, Saxifraga, Lantana, Gerbera

Neuter(Usually ending in um.)-

Nerium, Naustertium, Pisum, Pyrethrum, Lycium

How generic names are coined?

The generic name is always a noun. The generic name is always written or typed capital.

It printed in italics.

Following criteria are used for generic names of the plants

i) Commemorative names-

- Many plants are named after the individuals with a view to honor the the concerned person may be outstanding botanist, adventurous traveller. patron of science. noble man. a missionary who first discoverer of the plant.]-The name of the individuals are Latinized by adding appropriate Latin termination:-

Bauhinia- It is named after twin Bauhin brothers who were outstanding botanists. The name is very appropriate because the leaf of plant has a deep notch and has two equal halves.

Grayia- Asa Gray was an eminent American botanist.

Jeffersonia- Thomas Jefferson was philosopher, president of America.

Hookera - J.D. Hooker. who was Director of Kew Botanical gardens.

(ii) Descriptive Names-

Generic names are coined after some prominent feature of the plants concerned-

Culicarpa (Callis-beautiful, Carpon-fruit)- Plants having attractive fruits

Callistemon- _ Bottlebrush-plant is named Callistemon after coloured stamens

Alternanthera (Alternus-alternate. Anther-anther) Alternate stamens are sterile.

Chrysophyllum-Chryos-gold,phyllon-leaf -golden colour of the lower side of leaf.

Gladiolus - (Gladis-sword) Leaves are sword like-

Gossypium - Cotton rs named

Gossypium because of the soft fibres derived from testa

(iii) Native Names-

The native name is used in its original form or through adoption.

Often Latin termination is added.

Berberis- after the Arabic name berberys.

Bambusa- after the Indian name bamboo.

Luffa- Malayan name.

Lotus- Egyptian origin.

Chirata- An Indian name.

Nandina (Heavenly bamboo- A Japanese name.

(iv) Ancient Classical Names-

classical names from Roman and Greek mythology have been assigned to plants.- ;

Narcissus- Son of Cephisus and Liriope. a youth of remarkable beauty who fell in love with his own reflection in water ultimately he was changed into flower of the same name i.e. Narcissus

Dodocantheron (twelve gods)- This name is assigned to a plant which is supposed to be under the influence of 12 principal gods.

Circaea- This name is assigned to enchanter's night shade after Circe who according to a Greek legend was skilled in using poisonous plants

(v) Addition of Syllables-

Sometimes syllables are added to the generic names already in use, for example Metasequoia from SEQUOIA or PSEUDOTSUGA from TSUGA

(vi) Names of Intergeneric hybrids -

New generic name is assigned to an intergeneric hybrid. It is usually coined by combining syllables from the names of the parents. The names are prefixed by a cross.

cross. (x) Thus hybrid between Solidago and Aster is named as X Solidaster

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How are specific epithets selected?

The second part of the binomial name is specific epithet. The distinction between the generic name and specific epithet is that the generic name groups the plant, specific epithet fixes it. For example, *Rosa alba*. The *Rosa* is a generic name and includes all species of *Rosa* like *R. alba*, *Rosa canina*, *Rosa indica*. The specific epithets *alba*, *canina*, *indica* are ultimate designations and help us to fix the plant. The specific epithet is usually an adjective or a noun used adjectivally. The first letter of specific epithet is not capital but written in lower case. Specific epithet is underlined when hand written or typed. It is printed in italics. It must grammatically agree with generic name. Words from any language can be used to coin specific epithet after latinization. As examples of specific epithets one may cite *rosa*, *nigra*, etc. These can be used combination with many genera (if found appropriate) as components of binomial names. such as *Rosa alba*, *Datura alba* each specific epithet can be used only once in single genus.

It must be noted that almost any word except the generic name in current use can be used as specific epithet. Such combinations *Rosa rosa* or *N{agnolia magnolia* are not permissible.

2. Honor individual who first collected the species or a scientist who have contributed much to the botanical knowledge of a particular region or a taxonomic group e.g. *Solanum isabellii*, for Isabella, *Trichaulax mwasumbii* Vollesen after Mwasumbi (UDSM), *Sanrafaelia ruffonammari* Verdc. after Christopher K. Ruffo and Mmari

3. May refer to geographical origin The main sources of specific epithets are :- Characteristics of Species epithets

1 Specific epithets refer to different things:

May refer to distinctive morphological, ecological or chemical features e.g. *Alafia multiflora*, *Ipomoea aquatica*,
Tabernaemontana elegans, *Ficus religiosa*

Geographical epithets

Geographical epithets may reflect countries and localities:

0 *saharae* = of the sahara

0 *puguensis* of Pugu

0 *sanctae-helenae* = of St. Helena

0 *umalilaense* = of Umalila

0 *usambarensis* = of Usambara

0 *ugandaense* = of Uganda

0 *tanganyikaense* = of Tanganyika

0 *aethiopicum* = of Ethiopia

The ICBN recommends however that epithet taken from geographical names should be adjective and end with *-ensis* (-e), *-anus* (-a, -um), or *-icus* (-a, -um)

The specific name may not be tautonymous (repeat the generic name) as in *Benzoin benzoin*

(i) Commemorative names-

Distinguished persons are honoured by naming species after them. Adjectival endings such as ,
-ii, *-iae*, Thus-

baileyi-(Bailey)

roxburghii-(Roxburgh)

banksiana-(Banks)

banksiae (Joseph Banks)

dixitii (Prof Dixit)

(ii) Place of origin or place of the first report -

can be a city, mountain, district, country or even hemisphere-Thus:

indica (India)

mexicana (Mexico)

chinensis (China)

Japonicus (Japan)

antarctica (Antarctic region)

poonensis (Pune)

himalayensis (Himalaya)

(iii) Descriptive names-

The most common form of the specific epithets are descriptive adjectives. They may be single or combinations of adjectives. Thus:-

alba (white)

rubra (red)

nigra (black)

longifolia (long leaves)

latifolia (broad leaves)

gigantea (giant)

foetida (offensive smell), fragrans (fragrant)

religiosa (of religious importance)

acaulis (without stem), aphylla (leafless)

squamosa - tubercled.

(iv) Native or Vernacular names-

The names of plants used by native people are used to coin specific epithets. Thus:-

cacao- Native word of Aztecs

(vi) Specific epithets indicating similarity-

smilacifolius - leaves resembling those of Smilax

salviflorus - flowers resembling those of salvia.

sambucinus-eider like plant.

quercifolia- leaves resembling those of oak(Quercus).

bignonioides- resembling Bignonia

gossypifolia- leaves like those of cotton.

BOTANICAL -BINOMIAL NOMENCLATURE

(i) Names of all plants should consist of two words, the first word should be the name of the genus and the second should be specific epithet, thus the botanical name should be a combination of the generic name and the specific epithet.

(ii) The generic name is always a noun while the specific epithet is an adjective or a noun used adjectivally

(iii) The words should be from the Latin language. (Latin was the language widely used by scholars in Europe in those days.)

(iv) The first letter of the generic name should be capital while the first letter of the specific epithet should be in lower case(small).

(v) The generic name and the specific epithet should be underlined when hand-written or typed. Binomial name should be printed in italics.

(vi) Each genus and species should have only one valid, correct name. It is called legitimate name.

(vii) The abbreviated name of the author who assigned and used a particular name should follow the specific epithet. The name of the author, however, does not form the part of the name of the plant and should not be underlined. Rules and Recommendations-

The purpose of the rules is to bring order to the nomenclature.

The names which are not in keeping with the rules cannot be retained.

The recommendations are made with a view to bring uniformity and clarity to the nomenclature. They are meant for giving guidance in matters of nomenclature. Some important rules of nomenclature are as follows.

Rank and ending of Taxa names

Features of the Taxonomic Hierarchy

Names above the rank of GENUS are based upon the name of an included genus. Each rank has a distinctive ending that is attached to the stem of the name of the genus. e.g. Solanum is a genus in the family SOLANACEAE. The word TAXON is used to refer to a taxonomic category of any rank. The plural is TAXA. The name of a genus is always underlined or italicized; the first letter is capitalized. The names of genera are treated as NOUNS. The plural of genus is GENERA.

Transfer between ranks U When a genus, species, or subspecies is described at one rank and then transferred to another rank, the original author is placed in parentheses followed by the author who made the transfer. o Linnaeus named an alfalfa: *Medicago polymorpha* var. *orbicularis* L. But, Allioni thought it was deserving of species status, so: *Medicago orbicularis* (L.) Allioni. o The name "orbicularis" is called the basionym and has priority. o The type for *Medicago orbicularis* is that of *Medicago polymorpha* var. *orbicularis* L. o The same occurs when a species is transferred from one genus to another e.g. Linnaeus named a fern: *Cheiranthus tristis* L. but R. Brown thought it deserved a generic status so: *Matthiola tristis* (L.) R.

Features of the Taxonomic Hierarchy end The scientific name of a species is the combination of the name of the genus with the specific epithet. To be complete, the scientific name includes the authority e.g. *Solanum nigrum* Linnaeus. The word species is both singular and plural. It is always correct to write the specific epithet in all lower case [species named after people and after old generic names may be capitalized]. The specific epithet is usually considered to be an adjective that modifies the genus (noun), and it agrees in gender with the genus. When several species of one genus are given in sequence, the name of the genus can be abbreviated to its first letter e.g. *Hunteria congolana* and *H. zeylanica*.

The authority can be abbreviated to save space, especially for authors who described a large number of species. The author's name is never italicized or underlined. The names of subspecific ranks (subspecies, variety, form) consist of the name of the species followed by an abbreviation

of the rank, the subspecific epithet, and the authority for the subspecific name e.g. ***Solanum villosum subsp. miniatum*** (Bernh. ex Willd) Edmonds

Ranks of taxonomic categories

Category

Kingdom - bionta

Phylum- division--phyta

Subphylum - phytina

Class - opsida

Subclass - idae

Order- ales

Suborder - ineae

Family - aceae (see exceptions)

Subfamily - ariae

Tribe - eae

Subtribe - inae

genus- None, first letter capitalize, Ititalize

Species- genus plus specific epithet, italicize

Subspecies- None , genus name specific epithet. italicize

variety - italicize

Forma -

Major or obligatory ranks appear in boldface

Principle of priority-

Priority of names and Synonyms and Homonyms According to the principle of priority each taxon should be known by its earliest published name. It is possible that the plant is assigned different binomial names b-V botanists research different parts of the world. In such case the botanical

name was validly and effectively published first is considered to be legitimate name. The other names assigned to the plants for consideration are treated as synonyms.

If the same taxon has often been described and named more than once. The later names are called synonyms and are illegitimate - e.g. *Aloe walastonii* Rendle (1908) this same species was also published under other different names: - *Aloe angiensis* De Wild. (1921) - *Aloe beguaertii* De Wild. (1921) - *Aloe lanuriensis* De Wild. (1921)

A homonym is a name that has been used for more than one taxon *Convolvulus coeruleus* Sprengel, 1824 *Convolvulus coeruleus* Schumacher, 1827 - *Convolvulus coeruleus* Martens & Galeotti, 1854

After 1st January 1955, it is mandatory for botanists to furnish Latin Diagnosis (Latin description) of the Taxon. It is a prerequisite for valid publication. All taxa published prior to 1955 are considered to be valid irrespective of language of their origin.

Priority of names and synonyms. Nomenclature is based upon priority of publication i.e. the earliest legitimate name is the correct name (but note exceptions below) Each taxonomic group can have only one correct name, which is the earliest that is in accordance with the rules, except in specified cases. Priority begins with the publication of Linnaeus' Species Plantarum on May 1, 1753 and applies to the rank of family and below. The correct name of a species is the combination of the earliest published valid generic name with the earliest published valid specific epithet.

How do synonyms occur In some instances, the original author who describes the plant may place it in a particular genus but subsequent authors, often with a more complete understanding of the taxon and its representatives, may move that species into a new genus, reflecting a more accurate classification *Haumaniastrum minor* A.J. Paton

Acrocephalus minor Brig. (1894)

A. hptoides Baker (1900)

A. welwitschii Brig. (1900)

A. cononensis G. Taylor (1931) The following example shows how principle of priority is used

The name *Suratensis* was assigned to the species by Burmann (1768). The species was named by Lamarck as *Cassia glauca* in 1785. Since name *Cassia surattensis* was assigned first, it is considered to be the legitimate name.

Types and Nomenclature

The names of taxa of a rank of a family and below are based on nomenclatural types, which permanently fix a name to an actual physical specimen. The nomenclatural type (typus) of a taxon is an element to which the name of a taxon is permanently attached, whether as a correct name or a synonym. The nomenclatural type is not necessarily the most typical or representative element of a taxon.

Holotype is the specimen or illustration used by the author or designated by him/her as the nomenclatural type -

Lectotype is a specimen or illustration selected from the original material to serve as a nomenclatural type when no holotype was indicated at the time of publication or is missing

An isotype is any duplicate of the holotype, it is always a specimen

A syntype is any one of two or more specimens cited by the author when no holotype was designated, or any of one of two or more specimens simultaneously designated as types

A **paratype**- is a specimen or illustration cited in the protologue that is neither the holotype nor an isotype, nor one of the syntypes if two or more specimens were simultaneously designated as types

A **neotype**- is a specimen or illustration cited in the protologue selected to serve as a nomenclatural type as long as all of the material on which the name of the taxon was based is missing

When a holotype or a previously designated lectotype has been lost or destroyed and it can be shown that all the other original material differs taxonomically from the destroyed type a neotype may be selected to preserve the usage established by the previous typification

Effective and valid Publication

Effective Publication-

Publication of new taxa is effective only if printed matter is distributed through sale, exchange or gift to botanists and botanical institutions. The description is to be published in botanical

journals or periodicals . It is not effective if matter is published in newspapers or non scientific periodicals. Publication is not effective by oral communication at public meetings or by display of names in collections or gardens or by issue of microfilms made from hand written or typed material .

Valid Publication-

In order to be valid, the taxa must be effectively published..The rank of the taxon to be published must be clearly indicated. The taxon must be accompanied by Latin Diagnosis The principle of priority must be adhered to. Names which are effectively and validly published are, legitimate.

Single and double authority citation

The name of the species is treated to be complete only when name of the author(s) is given in full or abbreviated from after specific epithet. The name is not underlined and it does not part of the binomial name. Name of the author must be mention scientific publication. It is not obligatory to mention It In instances. Here are few examples

Polyalthia longfolia L (L=Linnaeus)

Magnolia pterocarpa , Roxb(Roxb-Roxburgh)

Assarina lancaolata, Hook (Hook=Hooker)

Albizzia lebbek, Benth (Benth = Bentham)

Artabotrys odoratissimus R. Br (RBr=Robert Brown)

Nomina conservanda Nornina Conseryanda-Conservation of names

Names rvhich have gained popularity Lry virtue of theii usage for a long time are conserved (retained.t even if they nls not in keeping with the provisions of ICBN. Such names are called Nomina Conservanda. For exarnple, it is necessary to add suffix-aceae (after name of genus) to coin the family name . However, the following eight names of families are retained even though they do not end in aceae. The names are retained because they figure in the taxonomic literature for a long time. If, however. botanists are to follow the provisions of ICBN in this regard, they are free to use alternate names.

Conservation of names

To avoid the disadvantages of a strict application of the rule of priority, the International Botanical Congresses have authorized the conservation of widely used names, even though they are NOT the oldest names. These nomina conservanda (conserved names) may be at the family, genus, and species ranks.

Conserved Name	Name as per the Provisions of ICBN
1. Cruciferae	Brassicaceae
2. Guttiferae	Clusiaceae
3. Papilionaceae	Fabaceae
4. Umbelliferae	Apiaceae
5. Composite	Asteracea
6. Labiatae	Lamiaceae
7. Palmae	Arecaceae
8. Graminae	Poaceae
