

PLANT NOMENCLATURE

Nomenclature is the assignment of names utilizing a formal system. The criteria for formally naming land plants algae and fungi are based on the rules and regulations of the International Code of Botanical Nomenclature or ICBN. (Separate code is applied for cultivated plants, the International Code of Nomenclature for cultivated plants).

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- Legitimate names are those that are in accordance with the rules of ICBN.
- Any name that violates one or more rules of ICBN is known as an illegitimate name.
- Any name that is validly published is known as valid name.oted upon
- The rules of ICBN can be somewhat complex , often necessitating careful scrutiny.
- Points of controversy and periodic changes to ICBN are voted upon during meetings of International Botanical Congress which assembles in about every six years.

PRINCIPLES OF NOMENCLATURE

- Botanical nomenclature is independent of zoological and bacterial nomenclature. The code applies equally to names of taxonomic groups treated as plants whether or not these groups were originally so treated.
- The application of names of taxonomic groups is determined by means of nomenclatural types.
- The nomenclature of a taxonomic group is based upon priority of publication.
- 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.
- Scientific names of taxonomic groups are treated in Latin regardless of their derivation.
- The rules of nomenclature are retroactive unless expressly limited.

- The details of ICBN are organized into a number of **Rules** (which are mandatory and written out as articles), **Notes** (which are binding and clarifying), **Recommendations** (which are not binding but suggested), and explanatory **examples** and **footnotes**.

SCIENTIFIC NAMES

- The *fundamental* principle of nomenclature is the fourth principle of ICBN, stating that every taxon, whether species , genus , family, etc can bear only one correct name. This is only common sense. Confusion would reign if taxonomic entities could bear more than one name or if one name could refer to more than one entity. The names assigned by the rules of ICBN are known as **scientific names**. Scientific names are by convention in the Latin language.
- Scientific names of species are in **binomials i.e.** composed of two names. The binomial convention was first used by Carolus Linnaeus, a Swedish botanist who is also known as “father of taxonomy”.

- An example is the binomial *Pinus roxburghii*. The first name of the binomial is the **genus name** and is always capitalized. The genus name may be abbreviated by its first letter, but only after it is spelled in its entirety (and would not be confused with another genus name), thus the above may be abbreviated as *P. roxburghii*. The second name of the binomial *roxburghii* in this case is the specific epithet.
- Binomial names are always either italicized or underlined.
- In contrast to scientific names, many taxa also bear common names (also called vernacular names which are used by people within a limited geographical region).

TAXONOMIC RANKS OF LAND PLANTS

• Kingdom	(various)	Plantae
Phylum [Division]	phyta	Magnoliophyta
Subphylum [Subdivision]	phytina	Magnoliophytina
Class	opsida	Asteropsida
Subclass	idea	Asteridae
Order	ales	Asterales
Suborder	ineae	Asterineae
Family	aceae	Asteraceae
Subfamily	oideae	Asteroideae
Tribe	eae	Heliantheae
Subtribe	inae	Helianthinae
Genus	(various)	Helianthus
Subgenus	(various)	Helianthus
Section	(various)	Helianthus
Series	(various)	Helianthus
Species	(various)	Helianthus annuus
Subspecies	(various)	Helianthus annuus ssp. annuus
Variety	(various)	Helianthus annuus var. annuus
Form	(various)	Helianthus annuus f. annuus

- Position is the placement of a taxon as a member of a taxon of higher rank. For example the position of the genus *Aster* is a member of the family *asteraceae*. Taxa may be the same in rank but different in position. *Rosa* and *Aster* are both at the rank of genus but different in position.
- The prefix *sub* may be used formally in a rank name if more categories are needed, such as subgenus or subspecies.
- A subspecies or variety name is trinomial(three names) *Taxicodendron radicans* ssp. *diversilobum* or *Brickellia arguta* var. *odontolepis*.

The rank of subspecies is above that of variety. It is possible but very rare to have a subspecies divided into varieties(quadronomials).

AUTHORSHIP

- All scientific names at and below the rank of family have an author, the person who first validly published the name. For example the full name of the family Rosaceae is Rosaceae Jussieu because de Jussieu first formally named the family.
- Full name of the genus Mohavea is Mohavea A.Gray.
- Although authorship is part of scientific name and should be cited in all scientific publications , in practice the author is not named in scientific names.

NOMENCLATURE TYPES

- The second principle of ICBN states that scientific names must be associated with some physical entity, known as a nomenclatural type or simply type.
- A nomenclatural type is almost always a specimen , e.g. a standard herbarium “sheet” specimen but it may also be an illustration.
- The type serves the purpose of acting as a reference for the name , upon which the name is based. If there is ever any doubt that the name is correct the type may be studied.
- There are different “types of types”. A **holotype** is the one specimen or illustration upon which a name is based, originally used or designated at the time of publication. It serves as the definitive reference source for any questions of identity or nomenclature. It is recommended that the holotype be deposited in any Internationally recognized herbarium and cited as one of the criteria for the valid publication of the name. Holotypes constitutes the most valuable of specimens and are kept under safe keeping in one herbarium.

- An **isotype** is a duplicate specimen of the holotype, collected at the same time by the same person from the same population. The ICBN recommends that isotypes be designated in the valid publication of a new name. Isotypes are valuable in that they are reliable duplicates of the same taxon and may be distributed to numerous other herbaria to make it easier for taxonomists of various regions to obtain a specimen of the new taxon.
- A **lectotype** is a specimen that is selected from the original material to serve as the type when no holotype was designated at the time of publication, if the holotype is missing, or if the original type consisted of more than one specimen or taxon.
- A **neotype** is a specimen derived from a non original collection that is selected to serve as the type when as long as all of the material on which the name was originally based is missing.

- A **syntype** is any specimen which was cited in the original work when the holotype was not designated, alternatively a syntype can be two or more specimens that were all designated as types.
- A **paratype** is a specimen cited that is not a holotype, isotype, or syntype.
- An **epitype** is a specimen that is selected to serve as the type if the holotype, lectotype, or neotype is ambiguous with respect to the identification and diagnosis of the taxon.

PRIORITY OF PUBLICATION

- The third principle of the ICBN is the priority of publication, which generally states that of two or more competing possibilities of a name, one published first is the correct one, with some exceptions. Priority of publication only applies to taxa at the rank of family or below.

CONSERVATION OF NAMES

- One adverse effect of the principle of priority is that scientific names that are well known and frequently used may be replaced by some other name if the latter was discovered to have been published earlier. This leads to a degree of instability of nomenclature. However in such a case a petition may be presented (in the botanical journal *taxon*) and voted upon at the international botanical Congress to conserve one name over another that actually has priority. Such a procedure is outlined as three amendments to the ICBN: *Nomina familiarum conservanda*, *Nomina generica conservanda et rejicienda*, and *Nomina species conservanda*.

NAME CHANGES

- Name changes can occur for two reasons:
- 1 because it is contrary to the rules(illegitimate)
- 2 because additional taxonomic study or research(for example a cladistic analysis) has resulted in the change of definition or delimitation of a taxon, this process is known as **taxonomic revision**.

DIVISION OF TAXON

- There are 4 basic types of nomenclatural activities that can result in a name change. First a single taxon may be divided into two or more taxa, often called “segregate taxa” because they are segregated from one another relative to the original classification. This is done generally via the recognition of features that clearly distinguish two or more features from one another. For example the genus *Langloisia* has been split and *Loeseliastrum*, based on a number of morphological, anatomical and palynological (pollen) features that distinguish them. Ideally the segregate groups should be monophyletic, as based upon a rigorous cladistic analysis.

Other examples of taxa being divided are:

- The genus *Carduus* of family Asteraceae is split into two genera *Carduus* and *Cirsium*.
- The genus *Rhus* of the anacardiaceae is split into: *Malosma*, *Rhus* and *Toxicodendron*.
- The family Liliaceae has been split into numerous families such as Alliaceae, Hyacinthaceae, Liliacea and Melanthiaceae.
- The genus *Haplopappus* s.s. of the Asteraceae is split into *Anisocoma*, *Ericameria*, *Hazardia*, *Haplopappus* and *Isocoma*.
- When a larger taxon is divided into two or more smaller taxa of the same rank, the terms **sensu lato (s.l).** and **sensu stricto (s.s.)** may be used to distinguish more inclusive or less inclusive treatment.

TAXA UNITED INTO ONE

- A second major name change occurs when two or more taxa are united into one. One reason for uniting taxa is the recognition that previous features used to distinguish them are unsupportive of them being different i.e. there is no clear discontinuity. Another reason to unite taxa may be based on cladistic studies, in which two or more separate taxa, one or more is demonstrated to be paraphyletic; thus one way to eliminate a paraphyletic taxon is to unite it with other taxa such that the new inclusive group is now monophyletic. In case of taxa being united the final name is that which was published earliest. Examples:
 - The species *Bebbia juneca* and *Bebbia aspera* were united into *B. juneca*.
 - The genera *Diplacus* and *Mimulus* united into *Mimulus*.
 - The family *Apocynaceae* and *Asclepiadaceae* were united into *Apocynaceae* s.l.

TRANSFERRED IN POSITION:

- One taxon of the other of the same rank.
- Examples:
- The species *Rhus laurina* transferred in position to genus *Malosma*, the name species being *Malosma laurina*
- The species *Sadum variegata* transferred to genus *Dudleya*, new species name being *Dudleya variegata*

CHANGE IN RANK

- The species *Eruca sativa* was changed to the rank of subspecies (of the species *E. vasicaria*) new name *Eruca vasicaria* ssp *sativa*
- The variety *Viguiera deltoidea* var. *viguiera parishii* was changed to the rank of species the new name being *Viguiera parishii*(with *V. deltoidei* persisting as a separate species).