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**Name of Topic: International Code of Botanical
Nomenclature (ICBN)**

International Code of Botanical Nomenclature (ICBN)

The International Code of Botanical Nomenclature (ICBN) is the set of rules and recommendations dealing with the formal botanical names that are given to plants. Its intent is that each taxonomic group ("taxon", plural "taxa") of plants has only one correct name that is accepted worldwide. The value of a scientific name is that it is an identifier; it is not necessarily of descriptive value, or even accurate.

The guiding principle in botanical nomenclature is priority. **The ICBN sets the formal starting date of plant nomenclature at 1 May 1753, the publication of Species Plantarum by Linnaeus** (or at later dates for specified groups and ranks). A botanical name is fixed to a taxon by a type. This is almost invariably dried plant material and is usually deposited and preserved in a herbarium, though can be an image. Some type collections can be viewed online at the websites of the herbaria in question. Both these principles are regulated and limited. To avoid undesirable effects of priority, conservation of a name is possible. Above the taxonomic rank of family very few hard rules apply (e.g. see descriptive botanical names).

The ICBN can only be changed by an International Botanical Congress (IBC), with the International Association for Plant Taxonomy providing the supporting infrastructure. Botanical nomenclature is independent of zoological and bacteriological nomenclature, which are governed by their own Codes. The ICBN applies not only to plants, as they are now defined, but also to other organisms traditionally studied by botanists. This includes blue-green algae (Cyanobacteria); fungi, including chytrids, oomycetes, and slime moulds; photosynthetic protists and taxonomically related non-photosynthetic groups. There are special provisions in the ICBN for some of these groups, as there are for fossils.

Principles of Botanical Nomenclature

There are **six principles** that guide decisions concerning the International Code of Botanical Nomenclature (ICBN).

Principle I : Straightforward Principle

Botanical nomenclature is independent of zoological and bacteriological nomenclature. The Code applies equally to names of taxonomic groups treated as plants whether or not these groups were originally so treated.

The other two principles are straightforward. Principle I states that botanical nomenclature is independent of zoological and bacteriological nomenclature. If an organism is considered to be a plant, then it must be named in accordance with the Botanical Code. If it is considered a bacterium, it must be named according to the Bacteriological Code.

Principle II : Type Principle

The application of names of taxonomic groups is determined by means of nomenclatural types.

For vascular plants such as grasses, a nomenclatural type is a herbarium specimen that has been deposited in a herbarium. A nomenclatural type anchors the meaning of a name. If there is an argument as to what kind of plant the author of a name meant by a particular name, one examines the type specimen. No matter what taxonomic treatment is followed, the name must be used in a sense that includes its type specimen.

There are several different kinds of type specimen, but the most important are **holotypes, lectotypes, neotypes, and epitypes**. The next most important are isotypes, syntypes, and paratypes. The first four kinds of type refer to specimens that are, unequivocally, the nomenclatural type of a name. **A holotype is a specimen that has been designated the nomenclatural type of a name by the person creating the name. If the person who originally published a particular name did not designate a holotype, a later taxonomist may select a specimen to serve as the nomenclatural type. This specimen then becomes what is called the lectotype of the name. If the holotype or lectotype is destroyed or lost, a new type specimen can be selected. Such replacement types are called neotypes. An epitype is a specimen selected to be the nomenclatural type of name for which there is a holotype, lectotype, or neotype available.** Why would it be necessary to select another specimen as a nomenclatural type? Sometimes the holotype, lectotype, or neotype simply does not show the features that are needed to determine, unequivocally, to which of two taxa it belongs. In such a case, it cannot be used to fix the meaning of a name. In such situations, another specimen can be selected as the ‘anchoring’ specimen; it is this specimen that is the epitype.

Principle III : Priority Principle

The nomenclature of a taxonomic group is based upon priority of publication.

This principle states, in essence, that if a taxonomic group has been given two or more names, the correct name is the first name that meets the Code’s standards for publication. Basically, this means that the priority of a name dates from the time that it was first published and made known to other botanists. Writing the name in a letter (or Email) to a colleague does not count, nor do notes made on herbarium sheets. The priority principle states that only the first name validly and legitimately published for a particular taxonomic group is correct.

In determining priority, the date that matters is the date on which the material was actually mailed to other institutions; this is not always the same as the year on the cover of a book or journal.

Principle IV : Uniqueness Principle

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.

The uniqueness principle states that there is only one correct name for a particular taxonomic group within a given taxonomic treatment.

Principle V : As-it-should-be Principle

Scientific names of taxonomic groups are treated as Latin regardless of their derivation.

Principle V states that scientific names are to be treated as if they were Latin, regardless of their derivation.

Principle VI : Retroactivity Principle

The Rules of nomenclature are retroactive unless expressly limited.

The Retroactivity Principle means that anyone proposing a change in the Code needs to consider the effect that the proposed change will have on names published in a wide range of literature and over a considerable period of time.

OTHER KEY PROVISIONS OF THE CODE

1. Any changes in the Code should be designed to increase the stability of plant nomenclature.

No one likes name changes, not even the taxonomists that propose them.

2. Every plant belongs to a species, every species to a genus, every genus to a family, every family to an order, every order to a class, every class to a division (also called a phylum nowadays - a concession to the greater number of zoologists in the world). This is the taxonomic hierarchy. Note that the Code assumes the existence of species. It does NOT state what constitutes a species, let alone discuss whether species are real. The Code also requires that plant diversity be summarized in a hierarchical structure. Again, it is not a question of whether such a structure really exists. The fact that the Code assumes the existence of species and a hierarchical structure does not mean that the assumptions are correct, merely that, in naming plants (and the zoological code is similar in this regard), one must act as if species are real and nature is hierarchical. Many people object to this, but no one has provided a persuasive argument for dropping the system.

PUBLISHING SCIENTIFIC NAMES

Before a name, even a name that has a Latin form, can be accepted as a scientific name, it must satisfy several criteria. Some of these have to do with its form, others with how its existence and meaning are made known to others.

Form

Principle V states that a scientific name must be treated as if it were Latin, but the Articles 16-28 of the Code also specify what form the name must take. I have summarized them in the table below:

Rank	Ending	Examples
Division (Phylum)	-phyta	Pinophyta, Magnoliophyta
Class	-opsida	Pinopsida, Liliopsida, Magnoliopsida
Order	-ales	Pinales, Liliales, Magnoliales
Family	-aceae	Pinaceae, Liliaceae, Magnoliaceae
Tribe	-eae	Pineae, Lilieae, Magnolieae
Genus	A noun	<i>Pinus</i> , <i>Lilium</i> , <i>Magnolia</i>
Species	Depends	<i>Pinus flexilis</i> , <i>Lilium grandiflorum</i> , <i>Magnolia grandiflora</i>
Variety	Depends	<i>Pinus flexilis</i> var. <i>humilis</i>

Family

Family names must be formed by combining a generic name with the suffix –aceae, but there are eight exceptions to this rule. Each of the eight exceptional names was almost universally used, and used in the same sense, throughout the world when the first edition of the Code was prepared and so, in accordance with the overriding goal of achieving nomenclatural stability, it was agreed that they would continue to be used. The eight names are Gramineae (Grass Family, alternative Poaceae) Palmae (Palm Family, alternatively Arecaceae), Cruciferae (Mustard Family, alternatively Brassicaceae), Leguminosae (Pea family, alternatively Fabaceae), Guttiferae (St. John's Wort Family, alternatively Clusiaceae), Umbelliferae (Carrot Family, alternatively Apiaceae), Labiatae (Mint Family, alternatively Lamiaceae), and Compositae (Daisy Family, alternatively Asteraceae).

Species

The name of a species is ALWAYS a binomial. 'Grandiflora' is not the name of a species. It has to be combined with a generic name to form the name of a species, as in *Magnolia grandiflora*. The word 'grandiflora' is what we call the specific epithet. It states which species

of *Magnolia* is under discussion. Specific epithets are often adjectives that describe some attribute of the plant (it helps to learn a little Latin - 'grandiflora' means large flowered), but may refer to the habitat of a species (pratensis - of fields, lacustris - of lakes, saxicola - of rocky places), the place where the species occurs (chinensis, europaea, canadensis), or a person that is somehow connected to the species (the connection may be remote) - wrightii (referring a single, male person named Wright), wrightiae (referring to a single female person named Wright), wrightorum (referring to 2 or more people, one of whom - and possibly only 1 out of a 100 - was male) or wrightarum (referring to 2 or more people with not even one male among them - the Romans were sexist).

Subspecies/ Variety

Technically speaking, subspecies is a higher rank than variety. A subspecies may include several varieties. In practice, most taxonomists nowadays use one rank or the other, but not both. Europeans tend to use subspecies and expect subspecies to occupy somewhat different areas whereas Americans use variety to denote plants that are different from the plants first put in the species. In practice, the two ranks are used almost interchangeably.

Writing Scientific Names

In North America it is customary to write names at the rank of genus and below in italics or some other font that sets them apart from the rest of the text. The most recent edition of the Code recommends that all scientific names, no matter what their rank, be in a different font from the rest of the text. Either practice makes it easy to scan for taxonomic information.

You will notice that scientific names are often followed by a word or a capital letter and a period, or one or more unintelligible (to the uninitiated) sets of letters. To join the initiated, read on.

Authorities

The letters and/or words that follow a scientific name (sometimes they may be within a name - more on that later) are a shorthand reference to the name of the person or person that first gave a name to the entity involved and, in some instances, to the person or persons who first treated it at the rank being used. This is probably easier to understand through some examples.

Consider: *Oryzopsis exigua* Thurber

Note that only the first two words are italicized. This means you are looking at the name of a species. 'Thurber' is the last name of the person who first gave a name to this species - and the name he gave to it is the one shown.

Consider: *Oryzopsis asperifolia* Michx

Again, you are looking at the name of a species in the genus *Oryzopsis*. This species was first named by a fellow whose name is abbreviated to Michx. The period tells you that his name has been abbreviated. His full name was Michaux.

Consider: *Distichlis spicata* (L.) Greene

Linnaeus [L. stands for Linnaeus] first described the entity, but as *Uniola spicata*, not *Distichlis spicata*. Greene was the first person to say no, these plants should be in *Distichlis* and then publish the combination "*Distichlis spicata*". Linnaeus gets credit for being the first person to describe the entity, Green for being the person to give it the name shown.