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# The Scientific Names of Plants

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Plants often have two names -- a common name used by most of us in everyday circumstances when we need to make reference to a plant growing in the yard or something that we might wish to purchase at the market. They also have scientific names or Latin names, as they are sometimes called, used by botanists, agronomists, and by the "serious" amateur, etc.

## COMMON NAMES

It would be foolish for me to maintain that common names have no value. They are the only names known to most of us. These names are often simple, easy to remember, descriptive, colorful, pleasing to the ear, and easy to pronounce.

Given this impressive list of advantages, why do we not simply use common names for plants and be done with it? There are several reasons why botanists and other scientists do not use them.

A plant may have more than one common name. The broad-leaved plantain, a common lawn weed, has almost fifty other common names in English alone. In California and Oregon, one of our common trees is called bay, bay leaf, California bay, myrtle, myrtlewood, pepperwood, and Oregon myrtle.

The same common name may be used for more than one plant. Laurel is a common name applied to trees in five different plant families. We all know what corn is. You may be surprised to learn that in other English-speaking countries, their corn is what we call wheat.

Many common names are confusing. A pineapple is not a kind of pine, nor is it an apple. Kentucky bluegrass is not blue, nor is it native to Kentucky. Names such as "welcome home husband, no matter how drunk ye be," "kiss me over the garden gate," "spotted arsemart," and "ramping fumitory" make it difficult to maintain that common names have brevity and clarity of meaning.

Because there are no universally accepted rules for giving common names to plants or a panel or committee that passes judgment, we cannot say that one is **the** correct common name. There are certainly instances in which this becomes critical. If you pay $1000 for an ornamental tree at a nursery, you want to be very sure of what you are getting.

Common names do not provide an indication of close relationship among the plants that share the name. Sour-grass, arrow-grass, blue-eyed grass, grass (marijuana), and China-grass are not kinds of grasses, nor are they related to one another.

Probably the most serious difficulty is that most plants do not have common names. We have used only a small portion of the half million or so kinds of plants to the extent that common names have been applied to them. This is a problem for authors of field guides, for consultants who write environmental impact statements, and for staff members in various state and federal agencies who must prepare material for general consumption. Authors have attempted to compensate for this lack of common names by inventing them, usually by translating the scientific name into English. The advantage of "Milo Baker's cryptantha" over Cryptantha milobakeri is not immediately apparent to me.

## SCIENTIFIC NAMES

Although scientific names may cause you some discomfort, their advantages to the botanist are compelling. There is a single, universally recognized name for each plant. Because they are used by botanists all over the world, scientific names facilitate the free transfer of ideas and information. Consider the difficulties that would arise if the botanists in the United States, England, Germany, Russia, China, etc. each had their own independent set of names for the plants of their countries.

The same scientific name may not be used for more than one kind of plant. Once it has been published, that name cannot be used again for any other plant.

Scientific names are governed by the International Code of Nomenclature for Algae, Fungi, and Plants. These regulations are reviewed every four years at International Botanical Congresses. Animals have their own separate code of nomenclature.

Inherent in our system of scientific names is the concept of evolutionary or genetic relationship. When we name the white potato, eggplant, and black nightshade Solanum tuberosum, Solanum melongena, and Solanum nigrum, respectively, we are indicating that these three plants belong to the same genus, Solanum, and that they are related to one another. Because there is a set of botanical features associated with the name, it has predictive value. If you know a plant belongs to the genus Quercus, the true oaks, you can predict all kinds of things about it. You can bet good money that it will be a tree or shrub with leaves of a certain shape, and that it will have the familiar acorn as its fruit type.

There are some difficulties with scientific names. They can be difficult to pronounce, especially if you did not learn to divide words into syllables early on in your education. You might note, however, that such familiar and easily pronounced common names as aster, rhododendron, magnolia, chrysanthemum, petunia, and begonia are also the first part of the scientific names of these plants. My own experience in teaching undergraduates to use scientific names is that once you can get past the psychological barrier that these are terribly long words that only those who have had a strong background in Latin and Greek can pronounce, then you will become much more comfortable with them and begin using them rather easily.

One of the most frustrating features of scientific names, especially for someone who is just learning about them, is that they are changed from time to time. Just when you think that you have become familiar with the scientific names for a particular group of plants, someone will publish a new revision of the group and you discover that some of the names have been changed. These changes come about for several reasons. As new information about the anatomy, chemistry, and genetics of plants and analytical techniques become known, it may cause botanists to rethink the evolutionary relationships among the plants being studied. These changes may require us to revise the scientific names to reflect the new level of information now available to us.
Sometimes names are changed, not for biological reasons, but because someone studying a group may discover that the name given to a particular plant has to be rejected because it violated some provision of the International Code.. Both of these examples point out one of the important operating principles in plant classification. As new information becomes available and as errors are discovered, we make adjustments and corrections. What appears to be a fine scheme of classification today may be modified drastically or even discarded completely at some point in the future.

## COMPONENTS OF SCIENTIFIC NAMES

In the botanical works of the 15th and 16th centuries, the scientific name of a plant was often a lengthy series of descriptive words, typically in Latin. These **phrase names** or **polynomials** became increasingly awkward because the discovery of a new kind of plant required that the existing polynomial be slightly modified so that it could be distinguished from the older one, as in the following examples:

Convolvulus folio Althaea (Clusius, 1576)

Convolvulus argenteus Althaea folio (Bauhin, 1623)

Convolvulus argentateus foliis ovatis divisis basi truncatis: laciniis intermediis duplo longioribus (Linnaeus, 1738)

A new way of naming plants, using only two words, was developed by Caspar Bauhin (1560-1624). August Rivinus (1652-1723) also proposed that plants ought to have names of no more than two words. You probably thought it invented by Carolus Linnaeus (1707-1778), because so many textbooks incorrectly give him the credit. At first, the use of this two-word scheme was sporadic. The event that perhaps more than any other assured its permanent use in scientific writing was that Linnaeus adopted it in his monumental work, "Species Plantarum." Here was a catalogue of all of the world's plants known to him , prepared by the leading naturalist of the day.

This system was based upon the principle that each plant (or animal for that matter, because they are named according to the same scheme) is given a scientific name that consists of two components, both of them parts of the taxonomic hierarchy mentioned above. The first element of the scientific name is the **genus** (or generic name), as in Triticum, the genus of wheat. The plural of genus is **genera**, not genuses. The second element is the **specific epithet**, as in aestivum, the particular kind of wheat called breadwheat. This second element of the scientific name is often incorrectly called the "species." It is the genus and

specific epithet together that form the species name. Triticum aestivum is the species name of bread wheat. Because the name of a plant or animal is the combination of these two words, the scientific name is called a **binomial** and we call this scheme of giving technical names to organisms the **binomial system of nomenclature**.

Here is an example from the "Species Plantarum."

> 11.
> Conyza foliis ovalibus integerrimus scabris subtus hirsutis. hirsuta

The "11" is the number Linnaeus assigned to this particular Conyza, a member of Compositae. Conyza is the genus. The next six words make up the **diagnosis**, the Latin description of the plant. The word hirsuta against the margin is the **nomen triviale** or **trivial name**. The binomial shorthand name for the plant is Conyza hirsuta.

## AUTHOR NAMES

The binomial, for reasons of completeness and accuracy, is followed by the name(s) of the person or persons who first published that name for the plant. For example, in the scientific name Zea mays L., the "L." stands for Linnaeus. You will also see his name abbreviated as Linn. or spelled out.

Sometimes you will see the abbreviation "f." after tha authors's name, as in "Hook. f." It stands for the Latin word **fil**, which means son. This plant, then, was named by the elder Hooker's son, who was also a famous botanist.

It is sometimes necessary to transfer the name of a plant from one genus to another, usually because more recent research has demonstrated that the plant was incorrectly assigned to a particular genus. For instance, one of our endemic California grasses was originally named Orcuttia mucronata by Beecher Crampton. A study by John Reeder demonstrated that this species was not closely to others in the genus and he moved the epithet into a new genus, Tuctoria. What was Orcuttia mucronata Crampton becomes Tuctoria mucronata (Crampton) Reeder. The person whose name is in the parentheses first published the specific epithet for the plant. The name after the parentheses is that of the person who transferred it into the genus where it now resides.

The same convention is used when the taxonomic rank of a plant is changed. The famous California botanist Alice Eastwood found a new manzanita that she named Arctostaphylos bakeri. Many years later, another expert on the genus concluded that Eastwood's shrub should not be recognized as a distinct species, but as a subspecies of Arctostaphylos pungens. Arctostaphylos bakeri Eastwood then becomes Arctostaphylos pungens Kunth ssp. bakeri (Eastwood) J. B. Roof.

If two or more person's names are involved, they are connected with the ampersand (&) or with et the Latin word for and, as in Torrey & Gray, Coulter et Rose, or Humboldt, Bonpland, & Kunth.

Most scientific names have rather straightforward authorship. Linnaeus published the name for one of our local duckweeds, Lemna minor, in his "Species Plantarum" in 1753. Look in volume 2, page 970 and there it is. Now let's turn to the name of a local endemic grass, Poa rhizomata. It was named by the noted American agrostologist, A. S. Hitchcock. However, you will not be able to find a scientific paper or a book authored by Hitchcock that contains that scientific name. The reason is that the name appears in the treatment of California grasses that Hitchcock was asked to prepare for the "Flora of California" by Jepson. It is Willis Linn Jepson who is the author of the flora; Hitchcock was a contributor. While it is common to see the combination cited as Poa rhizomata Hitchcock, it should be more accurately cited as Poa rhizomata Hitchcock in Jepson. The connector "**in**" alerts you to the fact that the first-named person actually authored a new name or made a new combination in a work that bears the second person's name. The rules allow you to omit the "in such-and such," but I do not believe that it is good practice. The more complete citation is a great help in tracking the name back through the literature.

What if a botanist proposed a new name or a new combination, but never actually published it? A later worker can, in a sense, give credit to this person's work when he or she publishes it by inserting the connector "**ex**" between their two names. Joseph Nelson Rose found a new relative of Spanish-moss in southern Texas. He proposed the name Tillandsia baileyi, but never actually published it. John Kunkel Small published the name in his "Flora of the Southeastern United States." The plant is now known as Tillandsia baileyi Rose ex Small. If you think of ex meaning "but actually published by" it might help. The rules again permit shortening the scientific name to Tillandsia baileyi Small.

## SUBSPECIES, VARIETIES, & CULTIVARS

It is often useful to recognize variation within a species. The two most widely used are the **subspecies** (abbreviated ssp. or subsp.) and the **variety** (abbreviated var.). These names also have authors, as in Cannabis sativa L. ssp. indica (Lamarck) E. Small & Cronquist. If the subspecies or varietal name is a repeat of the specific epithet, then the author is not repeated, as in Zea mays L. ssp. mays.

An additional explanation is needed for the term variety. For reasons that are obvious, we have developed many different cultivated strains of a particular crop plant or ornamental. There are literally thousands of different kinds of rice. There are probably hundreds of different kinds of tuberous begonias. In general parlance, we often call these varieties. However, for purposes of formal nomenclature, these variations are considered too minor and often too short-lived to warrant giving them a scientific name. The variety of botanical nomenclature is not used in these instances. Instead, we employ the term **cultivar** (abbreviated cv.). The "Martha Washington" geranium is technically known as Pelargonium hortense cv. 'Martha Washington.'

Many plants are of hybrid origin, that is they result from the accidental or purposeful crossing of two closely related plants. This can be reflected in the scientific name of the plant by inserting an "X." If the X occurs before the generic name (X Elyhordeum), then the plant is considered the result of a cross between two plants in different genera, Elymus and Hordeum in this example. If the X occurs between the generic name and the specific epithet, then the plant is the product of a cross between two species in the same genus. Tillandsia x smalliana is a hybrid between T. balbisiana and T. fasciculata.

## GENERIC NAMES

The scientific name of a plant is considered to be in Latin. Many really are. Many others are Greek. Some are a combination of Latin and Greek. Still others derive from many different languages. From a grammatical standpoint, the name of a genus is a singular noun or a word that is treated as a noun. Because they are singular, there are no such things as Poas, Ranunculi, Penstemons, etc.

In Latin, unlike English, nouns are masculine, feminine, or neuter. How do you tell the gender of a noun? There are no absolute rules, but here are some pretty good generalities:

- Generic names that end in -us, -er, or -on are usually masculine. One bit of convention, however, is that the genera of trees ending in -us (e. g. Quercus, Alnus, Fagus, Pinus) are considered feminine. The names of most rivers and mountains are masculine, unless they end in -a or -e.

- Generic names that end in -a, -ago, -ix, -odes, -oides, -is, and -es are usually feminine. The names of most countries, islands, cities, and trees are feminine.

- Generic names that end in -um and -dendron are neuter.

The names of many of our genera comes directly from the classical Latin or Greek names given to plants. Julius Caesar called a pine tree "pinus." Socrates wandered around in some grass that he would have called "agrostis." What we call figs, he called "ficus." Many other generic names were constructed by later botanists, using classical Latin and Greek roots, to describe a new genus. Linnaeus based the generic name Sagittaria on the Latin word sagitta, an arrow. What is our common name for plants of this genus? Arrowheads, because of the shape of the leaf blade. The table below presents some examples of these and other sources of generic names.

**SOURCES OF GENERIC NAMES**

**Classical Latin or Greek**

| | |
|---|---|
| Acer | Latin for the maple tree |
| Agrostis | Greek for a kind of grass |
| Arnica | Origin unknown |
| Cornus | Latin for a dogwood |
| Fagus | Latin for the beech tree |
| Juniperus | Latin for the juniper |
| Lathyrus | Greek for the sweet pea |
| Lilium | Latin for the lily |
| Phalaris | Greek for a canary grass |
| Pinus | Latin for a pine |
| Quercus | Latin for an oak |
| Taxus | Latin name for the yew |

**Medieval Latin- or Greek-based**

| | |
|---|---|
| Aquilegia | Latin, referring to petal shape |
| Borago | Latin, referring to hairiness |
| Linaria | Greek, flax-like leaves |
| Tanacetum | Greek, referring to immortality |

**Modern Latin- or Greek-based**

| | |
|---|---|
| Agrostemma | Greek, field + garland |
| Arctostaphylos | Greek, bear + bunch of grapes |
| Aristolochia | Greek, best + childbirth |
| Convallaria | Latin, a valley |
| Digitalis | Latin, a finger |
| Echinochloa | Greek, hedgehog + grass |
| Equisetum | Latin, horse + bristle |
| Gymnocladus | Greek, naked + branch |
| Hedychium | Greek, sweet + snow |
| Liquidambar | Latin, liquid + amber |
| Pennisetum | Latin, feather + bristle |
| Penstemon | Greek, five + stamen |
| Petasites | Greek, a broad-rimmed hat |
| Senecio | Greek, an old man |

**Modern names from mythology**

| | |
|---|---|
| Andromeda | Maiden chained to rock |
| Atropa | One of the Fates |
| Calypso | Daughter of Atlas |
| Cassiope | Mother of Andromeda |
| Hebe | Goddess of youth |
| Narcissus | Handsome, self-centered guy |

**Modern commemorative names**

| | |
|---|---|
| Adansonia | Michel Adanson, botanist |
| Blighia | Lt. William Bligh, naval officer |
| Carnegeia | Andrew Carnegie, industralist |
| Fremontia | John Fremont, U. S. Army officer |
| Fuchsia | Leonhart Fuchs, physician |
| Linnaea | Carolus Linnaeus, naturalist |
| Magnolia | Pierre Magnol, botanist |
| Nicotiana | Jean Nicot, diplomat |
| Parkinsonia | John Parkinson, apothecary |
| Resia | Richard Evans Schultes, botanist |
| Romneya | T. Romney Robinson, astronomer |
| Sequoia | Sequoya, Cherokee leader |
| Serenoa | Sereno Watson, botanist |
| Torreya | John Torrey, botanist |

**Modern vernacular names**

| | |
|---|---|
| Amelanchier | amelancier (French) |
| Bambusa | bambu (Malayan) |
| Cocos | coco (Portuguese) |
| Copaifera | copaiba (Brazilian) |
| Datura | dhatura (Hindi) |
| Ginkgo | gin + kyo (Japanese) |
| Hevea | heve (Guyanan) |
| Jasminum | yasmin (Persian) |
| Musa | mouz or moz (Arabian) |
| Petunia | petun (Brazilian) |
| Saccharum | singkara (Malay) |
| Sassafras | sasafras (Spanish) |

**Modern geographical names**

| | |
|---|---|
| Caribea | of the Caribbean |
| Heliconia | of Mt. Helicon |
| Parnassia | of Mt. Parnassus |
| Taiwania | of Taiwan |
| Utahia | of Utah |
| Yushiana | of [Mt.] Yushan |

**Anagrams**

| | |
|---|---|
| Docynia | Cydonia |
| Muilla | Allium |
| Tellima | Mitella |
| Tuctoria | Orcuttia |
| Tylecodon | Cotyledon |

**Who Knows?**

Aa
Iliamna
Liatris
Ratibida

## SPECIFIC EPITHETS

Specific epithets are adjectives, participles (verbs pretending to be adjectives) or nouns. If they are nouns, their endings do not change with the gender of the genus. But, if they are adjectives or participles then they must agree with the gender of the generic name. This can be tricky, as seen in the following examples:

| Masculine-Feminine-Neuter |
|---|
| albus-alba-album |
| canadensis-canadensis-canadense |
| pubescens-pubescens-pubescens |

In the first example, the Latin word for white has a different ending for each of three genders (-us, -a, -um). In the second example, the masculine and feminine have the same ending; in the third, all three genders have the same ending. Now let's take an epithet and see how it changes when used with three genera of grasses.

| Genus | Gender | Epithet |
|---|---|---|
| Elymus | Masculine | glaucus |
| Poa | Feminine | glauca |
| Pennisetum | Neuter | glaucum |

This bit of arcane lore also explains why Uniola laxa becomes Chasmanthium laxum or Haplopappus annuus becomes Machaeranthera annua when names are transferred from one genus to another.

Specific epithets can be commemorative, as in Arabis lemmonii or Cryptantha milo-bakeri. They may also be based on a classical or aboriginal name for that particular plant. Linnaeus named tobacco Nicotiana tabacum after the Taino Indian word that they used for the plant. However, most of the specific epithets have been constructed by using classical prefixes, suffixes, and roots to describe some feature of the plant that sets it off from others. In other words, most epithets function as adjectives to tell you something about the plant – its size, shape, color, surface features, numbers of parts, etc. Here are some examples of prefixes, suffixes, roots, and classical/aboriginal names that have been used as specific epithets.

## SOURCES OF EPITHETS

### Prefixes: Numbers of Parts

| | |
|---|---|
| uni-/mono- | 1 |
| bi-/di- | 2 |
| tri- | 3 |
| quadri-/tetra- | 4 |
| quinque-/penta- | 5 |
| sex-/hexa- | 6 |
| semptem-/hepta- | 7 |
| octo- | 8 |
| novem-/ennea- | 9 |
| decem-/deca- | 10 |
| amphi- | of two kinds or conditions |
| dicho | in two |
| diplo- | double |
| haplo- | single |
| multi- | many |
| myrio- | countless |
| oligo- | few |
| pan- (panto-) | all |
| pauci- | few |
| pluri- | several |
| poly- | many |
| sesqui- | one and a half |
| terni | in 3's |

### Prefixes: Relative Position

| | |
|---|---|
| a- (ab-) | away from |
| ad- | toward, against |
| amphi- | on both sides of |
| apo- | apart, away from |
| dia- | through |
| circum- | around |
| cis- | on this side |
| ecto- | out of , from |
| endo- | inside of, within |
| epi- | on top of |
| ex- | from, out of |
| extra- | outside |
| hyper- | beyond, above |
| hypo- | beneath |
| infra- | below |
| inter- | between or among |
| intra- | within |
| intro- | inside |
| ob- | against |
| para- | near, beside |
| peri- | around |
| sub- | below |
| super- (supra-) | above |
| syn- | together, united |
| trans- | across, beyond |
| ultra- | beyond |

### Prefixes: Shapes & Sizes

| | |
|---|---|
| angusti- | narrow |
| brachy-/brevi- | short |
| crass- | thick |
| cyatho- | cup-shaped |
| cyclo- | circular |
| fili- | thread-like |
| hemi- | half |
| hetero- | different |
| holo- | entire |
| homo- | like or same |
| iso- | equal |
| lanci- | lance-shaped |
| lati- | broad |
| lepto- | slender |
| longi- | long |
| macro- | large |
| mega- | really large |
| micro- | small |
| nano- | dward |
| odonto- | tooth-shaped |
| ortho- | straight |
| ovi- | egg-shaped |
| pachy- | thick |
| parvi- | small |
| platy- | broad |
| semi- | half |
| steno- | narrow |
| tenui- | slender |
| uro- | tailed |

### Prefixes: Color

| | |
|---|---|
| atro- | black |
| chloro- | green |
| chryso- | golden |
| cyano- | dark blue |
| erythro- | reddish |
| flavi- | yellowish |
| leuco- | white |
| melano- | black |
| ochro- | yellowish |
| rhodo- | rose-colored |
| viridi- | green |
| xantho- | yellowish |

### Prefixes: Surfaces

| | |
|---|---|
| argyro- | silvery |
| dasy- | shaggy |
| erio- | woolly |
| gymno- | naked |
| hirti- | long-hairy |
| laevi- | smooth |
| lani- | smooth |
| leio- | smooth |
| lepido- | scaly |
| nudi- | naked |
| trachy- | rough |
| tricho- | hairy |

### Prefixes: Miscellaneous

| | |
|---|---|
| a- | without |
| actino- | star-shaped |
| andro- | male |
| carpo- | relating to fruits |
| crypto- | hidden |
| e- | without |
| eu- | true, good |
| gamo- | fused or united |
| geo- | relating to the earth |
| gyno- | female |
| laxi- | loose |
| neo- | new |
| non- | not |
| oxy- | sharp |
| phanero- | easily visible |
| phyllo- | pertaining to a leaf |
| phyto- | pertaining to a plant |
| pseudo- | false |
| ptero- | winged |
| rhizo- | pertaining to roots |
| sapro- | rotten |
| schizo- | deeply divided |
| sclero- | hard |
| xero- | dry |
| xylo- | woody |
| zygo- | joined |

### Suffixes

| | |
|---|---|
| -aceus | resembling |
| -aeus | belonging to |
| -alis | possessing or pertaining to |
| -anus | belonging to |
| -arium | a place where work is done |
| -ascens | becoming |
| -aticus | place of growth |
| -atilis | place of growth |
| -bundus | having an abundance of |
| -cundus | aptitude or tendency |
| -ensis | place of origin or growth |
| -escens | becoming |
| -estris | place of growth |
| -eus | resembling |
| -icans | more or less identical to |
| -icola | dwelling in |
| -icus | belonging to |
| -idus | in progress |
| -inus | possessing or resembling |
| -oides (-deus) | resembling |
| -orius | capability |
| -osus | having an abundance of |
| -ulentus | fullness |

### Classical/aboriginal Names

| | |
|---|---|
| batata | Indian name for sweet potato |
| carota | Ancient name for carrot |
| cepa | Latin name for the onion |
| intybus | Latin for endive |
| mays | Indian name for corn or maize |
| napus | Latin for turnip |
| rhoeas | Greek for a wild poppy |
| tabacum | Indian name for tobacco |

### Geographical Names

| | |
|---|---|
| anglicus | of England |
| australis | southern |
| borealis | northern |
| canadensis | of Canada |
| centralis | central |
| chilensis | of Chile |
| gallicus | of France |
| germanicus | of Germany |
| helvitcus | of Switzerland |
| hispanicus | of Spain |
| ludovicianus | of Louisiana |
| novae-anglicae | of New England |
| noveboracensis | of New York |

| | |
|---|---|
| occidentalis | western |
| orientalis | eastern |
| septentrionalis | northern |
| sinensis | of China |

**Stature**

| | |
|---|---|
| altissimus | tall |
| angustatus | narrow |
| depauperatus | reduced |
| elata | taller |
| exiguus | little |
| humilis | dwarf |
| procerus | very tall |
| pumilus | dwarf |
| pusillus | very small |

**Growth Form**

| | |
|---|---|
| arboreus | tree |
| decumbens | reclining |
| dumosus | shrubby |
| fruticosus | shrubby |
| furcatus | forked |
| gracilis | slender |
| patens | spreading |
| prostratus | lying flat |
| radiatus | spreading from the center |
| ramosus | branched |
| repens | creeping |
| scandens | climbing |
| volubilis | twining |

**Habitat**

| | |
|---|---|
| agrestis | of fields or cultivated lands |
| alpestris | almost alpine |
| alsodes | of the woods |
| arenarius | growing in sand |
| arvensis | of the fields, esp. plowed |
| campestris | of the fields |
| collinus | of the hills |
| demersum | growing under water |
| fluitans | floating on the water |
| fluviatilis | of the rivers |
| fontinalis | of the springs |
| lacustris | of the lakes and ponds |
| littoralis | of the seashore |
| maritimus | of the sea |
| muralis | growing on walls |
| natans | floating on the water |
| nemoralis | of the groves |
| paludosus | of boggy places |
| palustris | of the marshes |
| pratensis | of the meadows |
| riparius | of the river banks |
| ruderalis | of waste places (weedy) |
| rupestris | among the rocks |
| sativus | cultivated |
| saxitilis | of the rocks |
| sylvaticus | of the woods |
| tectorum | of roofs or houses |
| terrestris | of dry ground |

**Surfaces & Margins**

| | |
|---|---|
| aculeatus | prickly |
| aristatus | awned |
| barbatus | bearded |
| ciliatus | fringed with hairs |
| comosus | bearded, tufted |
| crispus | curled |
| dentatus | toothed |
| echinatus | spiny |
| farinosus | mealy |
| glaber | smooth |
| guttatus | spotted |
| hystrix | bristly |
| inermis | unarmed |
| integerrimus | quite entire |
| laevigatus | smooth, as if polished |
| lanosus | woolly |
| maculatus | spotted, blotched |
| marginatus | edged |
| mollis | soft-hairy |
| mucosus | slimy |
| muricatus | with short, hard points |
| nitens | shining, polished |
| papillosus | pimply |
| pubens | downy |
| punctatus | with glands, pits, dots |
| rugosus | wrinkled |
| scaber | rough, harsh |
| serratus | sawed |
| sericeus | silky |
| setosus | bristly |
| sulcatus | furrowed |
| undulatus | wavy-margined |
| urens | stingning |
| velutinus | velvety |
| vittatus | striped |

**Shapes**

| | |
|---|---|
| acicularis | needle-like |
| acris | sharp-pointed |
| alatus | winged |
| auriculatus | eared |
| campanulatus | bell-shaped |
| capillaceus | hair-like |
| carinatus | keeled |
| caudatus | tailed |

| | |
|---|---|
| clavatus | club-shaped |
| cornutus | horned |
| costatus | ribbed |
| cristatus | crested |
| cuneatus | wedge-shaped |
| flabellatus | small fan |
| linearis | narrow, linear |
| lunatus | crescent-shaped |
| lyratus | lyre-shaped |
| obtusus | blunt |
| pungens | sharp-pointed |

**Colors**

| | |
|---|---|
| albus | white |
| argenteus | silvery |
| atropurpureus | dark purple |
| aurantiacus | orange |
| aureus | golden-yellow |
| azureus | sky-blue |
| caeruleus | deep blue |
| canescens | becoming grayish |
| cinereus | ash gray |
| citrinus | lemon |
| coccineus | scarlet |
| croceus | saffron |
| ferrugineus | rusty |
| flavus | yellow |
| flavescens | becoming yellow |
| glaucus | gray-green |
| incanus | whitish-gray |
| incarnatus | flesh-colored |
| lividus | lead-colored |
| murinus | mouse-colored |
| niger | black |
| niveus | purest white |
| purpureus | purple |
| roseus | rose-colored |
| rubens | reddish |
| sanguineus | blood red |
| stramineus | straw-colored |
| violaceus | violet |
| virens | green |
| discolor | not uniformly colored |
| concolor | of uniform color |
| versicolored | variously colored |

**Uses**

| | |
|---|---|
| edulis | edible |
| esculentus | edible |
| officinalis | medicinal, official |
| somniferum | sleep inducing |
| textilis | having useful fibers |
| tinctorius | used in dyeing |

**Miscellaneous**

| | |
|---|---|
| acaulis | stemless |
| amabilis | lovely in appearance |
| arundinaceus | reed-like |
| baccatus | berry-like |
| caducous | falling early |
| cernuus | nodding or drooping |
| communis | gregarious |
| debilis | weak |
| didymus | paired |
| formosus | beautiful |
| frondosus | leafy |
| foetidus | foul-smelling |
| furcatus | forked |
| geniculatus | abruptly bent |
| graveolens | heavy-scented |
| hyemalis | of winter |
| imbricatus | overlapping |
| junceus | rush-like |
| lucidus | bright, clear |
| mirabilis | wonderful |
| nivalis | showy |
| ovinus | of sheep |
| nudatus | exposed |
| pectinatus | comb-like |
| perrenans | perennial |
| peregrinus | exotic |
| plicatus | folded in pleats |
| praecox | developing very early |
| pulchellus | beautiful |
| serotinus | developing late |
| speciosus | beautiful |
| spectabilis | showy |
| truncatus | cut off at the end |
| tuberosus | having a swollen part |
| uncinatus | hooked |
| validus | strong |
| ventricosus | swollen, especially on 1 side |
| virgatus | twiggy |
| vulgaris | common |

## WRITING SCIENTIFIC NAMES

There are a few simple rules that must be followed in writing scientific names. The genus is always capitalized. The specific epithet should not be capitalized. The rules allow them to be if they are commemorative, as in Elymus Smithii (a relative, no doubt) or if the epithet was once a generic name itself, as in Acer Negundo, the box-elder. Even in such instances, however, the rules discourage capitalization.

The generic name and specific epithet are underlined when they appear in handwritten or typed material.

They are put in italics or bold-face in printed text. The name or names that constitute the authority get an initial capital letter, just as in ordinary usage. They are not underlined, bolded, or italicized.

## PRONOUNCING SCIENTIFIC NAMES

The International Code specifies that scientific names of plants are to be treated as Latin words, regardless of their origin. Why Latin? Because it was the language of scholars and generally educated people in Europe and most of the western world at the time that botanists starting getting serious about a stable system of naming plants. Scholarly works of all sorts were published in Latin. When Linnaeus was botanizing in France, Germany, and England he spoke in Latin to his hosts and to those who joined him on his jaunts. And they understood him and answered back! To a considerable degree, English has replaced Latin in this century as the "international language" of science and business.

Stearn (1992) noted that "How [scientific names] are pronounced really matters little provided they sound pleasant and are understood by all concerned. This is most likely to be attained by pronouncing them in accordance with the rules of classical Latin pronunciation." A few of the more scholastically inclined botanists will argue, therefore, that we ought to pronounce scientific names according to the strict rules of the sounds of vowels and consonants in Latin and that great care should be taken in accenting the proper syllable. But, there are traditional English, reformed academic, and Church Latin versions of Latin to choose from, each with its own set of rules for pronunciation.

Most American botanists pronounce the scientific names of plants as though they were English words. Some of us follow the rules in Latin for determining which syllable is accented; most of us do not. Many of us pronounce scientific names the way we were taught as undergraduates (if any formal discussion occurred) or more commonly we imitate the way our professors said them when we took their classes. These become the familiar and "correct" way to pronounce the scientific names of plants.

The following is an attempt to present a basic guide to pronouncing vowels, consonants, and diphthongs, together with some of the rules for accenting syllables. It is based largely on the work of the late William T. Stearn, who was generally acknowledged as the world's leading expert on botanical Latin.

- The letters of the Latin alphabet are basically the same as ours, except that J, U, and W did not occur in the classical version.

- Each syllable will contain a vowel or a double vowel combination (ae, au, ei, oe, or ui). These are called diphthongs.

- Pronounce all of the syllables. Ribes is "ri-bees," not "rībs."

- Final vowels are long, with the exception of a. If a word ends in two vowels (unless they are a diphthong), they are sounded separately. The epithet quinquefolia is pronounced "kwin-kwe-fo-li-ah."

- The diphthongs "ae" and "oe" have the sound "e," as in beat; "au" has the sound of "aw," as in the word awful; "ei" usually has the sound "i," as in site; "eu" has the sound of "u," as in neuter; and "ui" has the ui-sound in the word ruin.

- The "oi" in the ending "-oides" is treated as a diphthong by most American botanists and we give it the sound that "oi" has in the word oil. This habit is considered close to barbaric by English and Europeans who are much more persnickety about such matters. Because these two vowels do not form a diphthong, they should be pronounced separately, so that the ending "-oides" has the sound "-o-e-deez."

- A single consonant is placed with the following vowel, as in "pa-ter." Double consonants are separated, as in "am-mi." If there are two or more consonants, the first one is usually put with the preceding vowel, as in "an-gli-cus."

- B, d, f, h, l, m, n, p, qu, and z are pronounced the same in Latin and English.

- The consonants c and g are soft (that is, have the sounds of "s" and "j") if they are followed by ae, e, i, oe, or y. Otherwise, the c is pronounced like a "k" and the g is also hard, as in "go." The s is always pronounced as it is in the word "so," not as a "z." An initial x is pronounced as a "z," not "ek-z." Xanthium is "zan-thi-um," not "ek-zan-thi-um."

- The first letter is silent in words beginning with cn, ct, gn, mn, pn, ps, pt, and tm.

- Accenting the proper syllable can be tricky. Sometimes the author of a flora or other manual may provide assistance by including an accent mark. Most do not. If included, they are for the convenience of the reader and they are not part of

the scientific name itself. If you must determine which syllable to accent, the following rules may be helpful. Words of two syllables are always accented on the first syllable. In words of three or more syllables, the last syllable is never accented. The stress will fall either on the next to the last syllable (the penultimate syllable), as in "ar-ven-sis," or on the third from the last syllable (antepenultimate), as in "an-gli-cus." No matter how long the word, the accent can never be to the left of the antepenultimate syllable. Deciding between these two options is a difficult choice. Accent the penultimate syllable if it ends in a consonant, diphthong, or in a long vowel.

- Commemorative names or patronyms, as they are sometimes called, present a special problem because giving them the proper accenting can preserve the person's name or can render it all but unrecognizable. Hooker and Arnott named a chenopodiaceous shrub Grayia, after Asa Gray, the eminent Harvard botanist. Almost anywhere that you choose to accent the word, Dr. Gray's name still comes through.

  On the other hand, John Torrey named Pleuraphis jamesii after Dr. Edwin James, the surgeon-botanist on the Stephen Long Expedition to the Rocky Mountains. The epithet jamesii should be pronounced "ja-mee-see-i," which has the unfortunate effect of obscuring its origin. The commonly encountered western U. S. pronunciation of "jamz-e-i" preserves it. The rosaceous genus Ivesia is named after Lieutenant Eli Ives, the leader of one of the Pacific railway surveys. Pronouncing the genus "i-vee-see-i-a" is technically correct, but leads to the same problem. Most American botanists tend to ignore the strict rules for accenting patronyms.

- William Weber (1986) offered three suggestions for American botanists when speaking with our counterparts educated in other countries: (1) Try to say the names of the plants as they are being pronounced by the person you are talking to; (2) Remember that Europeans pronounce their vowels differently than we do; and (3) Try not to distort the sounds of words by accenting unimportant connecting vowels, which he admits flies in the face of "the rules."

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## FAMILY NAMES

The scientific names of families, tribes, and orders, etc. are also governed by the International Code. Unlike the names of individual plants and genera, these names have standardized endings. With a few exceptions, they must also be based on a generic name.

Family names must end in the suffix "-aceae," as in Araceae, Rosaceae, etc. But there is an escape clause in the Code that gives primacy to eight family names that were published many years ago, long before the rules for naming families had been adopted and a family name ending in -aceae had been published. This is the only example of two equally correct alternatives allowed in the Code. These families, with one possible exception, are well-known to most of use. Plants in these families are commonly encountered and economically important.

**THE EIGHT FAMILIES**

| | | |
|---|---|---|
| Sunflower | Compositae | Asteraceae |
| Mustard | Cruciferae | Brassicaceae |
| Grass | Gramineae | Poaceae |
| Garcinia | Guttiferae | Clusiaceae |
| Mint | Labiatae | Lamiaceae |
| Bean | Leguminosae | Fabaceae |
| Palm | Palmae | Arecaceae |
| Carrot | Umbelliferae | Apiaceae |

## THE TAXONOMIC HIERARCY

A hierarchy is a system of organizing people or things in ranks one above the other, often to show status, authority, or inclusiveness. Common examples include assistant professor, associate professor, professor or lieutenant, captain, major, colonel, and general. On the campus or in the military an individual moves from one level to a higher one based on performance reviews.

In botanical nomenclature, we use the term differently. Each of the levels is called a **rank** and each is comprised of the plants of lower rank. In other words, all of the species of pine trees belong to the genus Pinus. That genus and closely related genera form the family Pinaceae. The ranks recognized by the Code are:

Kingdom
Division or Phylum
Class
Order
Tribe
Family
Genus
Species

Other ranks, such as subfamily or subgenus, may be intercalated as needed.

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