Description

The format for writing scientific names of animals and plants is standardized and internationally accepted. “Scientific nomenclature” refers to various names according to a specific field of study. This article is the first in a series on *scientific nomenclature* within specific kingdoms.

Usually, animals & plants are identified by common and scientific names.

> Common name: These are used locally and may vary by region or country.
>
> Scientific name: These are unique names used by the scientific community to accurately and universally identify species.

International Codes of Nomenclature

Taxonomists have established several “codes” for scientific nomenclature. These codes are universal and are periodically updated by consensus. The protocol for naming species was invented in the 1700s by Swedish botanist Carl Linnaeus. Linnaeus created the system of “binomial nomenclature,” which uses only two designations–genus and specific epithet as the species name.

In the mid-1800s, scientists agreed on an expanded system of nomenclature. The following codes are used today:

- *International Code of Nomenclature for algae, fungi, and plants.*
- *International Code of Zoological Nomenclature.*
- *International Code of Nomenclature of Bacteria recently changed to International Code of Nomenclature of Prokaryotes.*
- *International Code of Nomenclature for Cultivated Plants.*
- *International Code of Phytosociological Nomenclature.*
- *International Committee on Taxonomy of Viruses–publishes several reports including How to Write a Virus Name.*

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Common names of species can vary by geographic region but a universal protocol helps avoid ambiguity and ensures consistency.

Hierarchy

Known as the "taxonomic hierarchy," the system consists of several groups of species based on genetic and phylogenic characteristics. The highest level is the "kingdom." The first kingdom comprised only two types of living organisms—animals and plants. We have seven classifications within the kingdom domain—Bacteria, Archaea, Protozoa, Chromista, Plantae, Fungi, and Animalia.

Note that the designations are in Latin. This could be challenging for some who are not familiar with that language; however, the terms are globally consistent. There is no need to interpret them or translate them into another language.

The levels from highest to lowest classification are as follows:

- Domain
- Kingdom
- Phylum
- Class
- Order
- Suborder
- Family
- Genus
- Species
- Subspecies

Using this system, the gray wolf, for example, would be identified as follows:

- Domain: Eukarya.
- Kingdom: Animalia.
- Phylum: Chordata.
- Class: Mammalia.
- Order: Carnivora.
- Suborder: Caniformia.
- Family: Canidae.
- Genus: *Canis.*
- Species: *lupus.*

Binomial Name

The binomial name consists of a genus name and specific epithet. The scientific names of species are italicized. The genus name is always capitalized and is written first; the specific epithet follows the genus name and is not capitalized. There is no exception to this.

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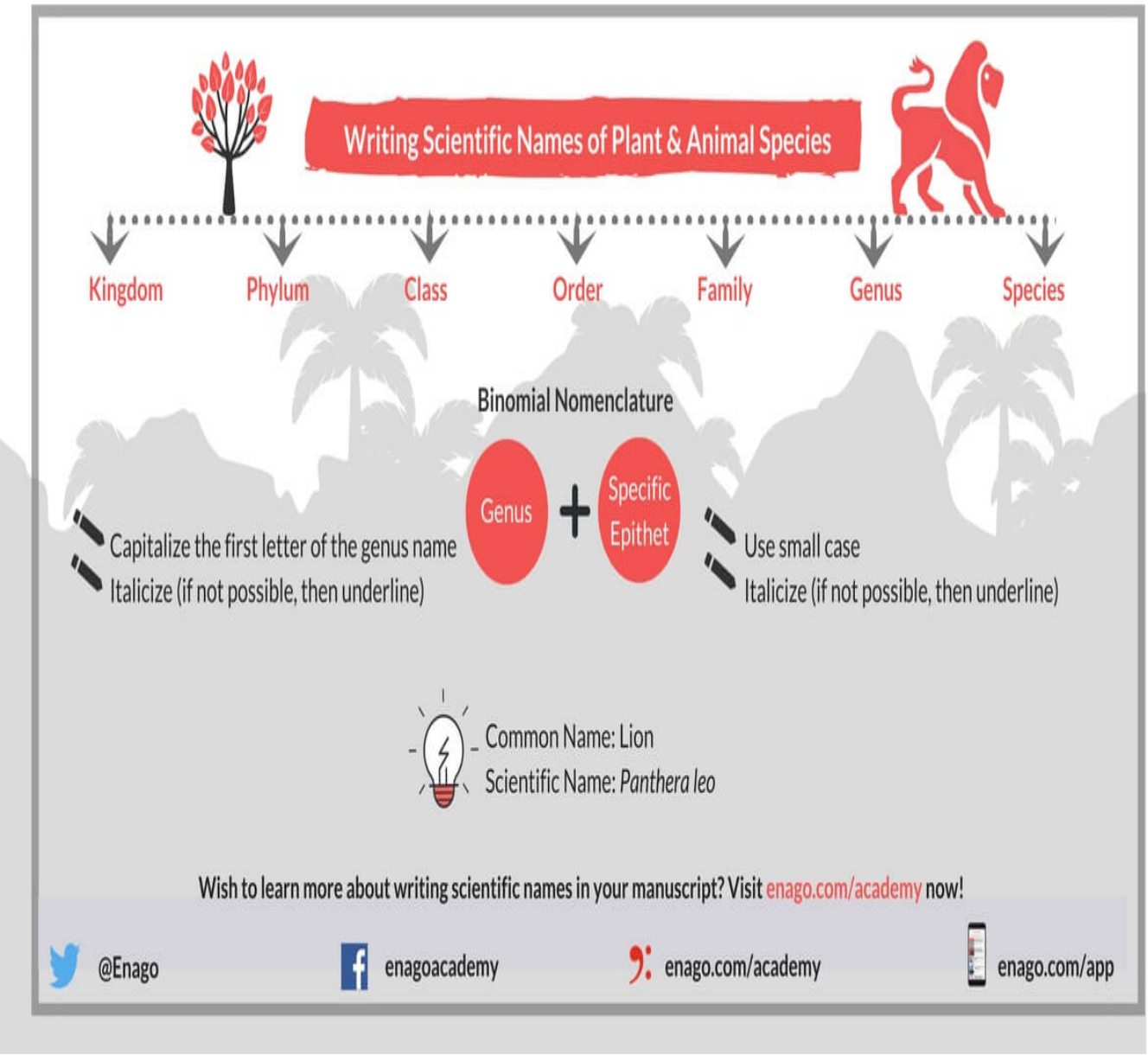
From above example, note that the classifications go from general (Animalia) to specific (***C. lupus***). A species, by definition, is the combination of both the genus and specific epithet, not just the epithet. For example, we can use the term **gray wolf** but we cannot use just ***Canis*** or ***lupus*** to describe this animal. ***Canis lupus*** is a species.



Writing Scientific Names of Animals

When writing, we use both the scientific name and the “common” name on the first mention. We then choose which to use throughout and make it consistent.

- **Gray wolf (*Canis lupus*)** is native to North America and Eurasia.

In subsequent references, we can use either the common or scientific name. If we use the scientific name, we need only to use the first letter of the genus followed by a period and the specific epithet. For

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example:

- In North America, the **gray wolf** was nearly hunted to extinction.
- In North America, ***C. lupus*** was nearly hunted to extinction.

It is also common to refer to several species under one genus when you want to point out some similar characteristics within a genus. For example:

- All species of ***Canis*** are known to be moderate to large and have large skulls.

You could also write this same information another way as follows:

- ***Canis* spp.** are known to be moderate to large and have large skulls.

In this case, “spp.” is an abbreviation for “several species” (“sp” is the designation for one species) in the genus. Either of the above is acceptable. If you are focusing on a few species in particular, you would refer to the species name of each one.

> You might also see a scientific name followed by an initial or abbreviation. This would denote the person who discovered or named the species. For example, in *Amaranthus retroflexus* L., the L (not italicized) refers to the original name given by Linnaeus.

Exceptions

There are a few exceptions to some of these rules. First, the entire genus name must be spelled out if it begins a sentence, even if a subsequent reference:

- ***Canis lupus*** was nearly hunted to extinction in North America.

Second, when more than one species has the same genus initial but come from different genera, the genera names are spelled out to avoid confusion:

- Both the gray wolf (***Canis lupus***) and the beaver (***Castor canadensis***) are native to North America.

In this case, it is best to use the common name after the first mention, but either format is correct.

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Titles and Headers

In titles, it is appropriate to write the entire scientific name of animals in uppercase letters. For example:

- A Study of the History of **CANIS LUPUS** in North America

In an italicized header, the species name can be written in non-italic style. For example:

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- **Canis lupus** *is nearly extinct in North America*

Writing Scientific Names of Plants

Plant names also follow binomial nomenclature (similar to animal names).

- **Royal grevillea *(Grevillea victoriae)*** is found in New South Wales and Victoria.

In the plant kingdom, classification after species is subspecies (subsp.) and variety (var.). For example, there are three subspecies of ***Grevillea victoriae.***

- *Grevillea victoriae* subsp. *victoriae*
- *Grevillea victoriae* subsp. *nivalis*
- *Grevillea victoriae* subsp. *brindabella*

When the species of a plant is unknown, a plant can be referred as *Grevillea* sp.

Moreover, when we collectively want to refer few or all species, we use *Grevillea* spp.

> Similar to animal names, it is common to see a specific epithet that refers to a geographic area or the person who discovered it. For example, *Grevillea victoriae* F.Muell. Although these are proper nouns, they are still written in lowercase font. Be mindful that some word processors might attempt to capitalize these references.

This is something to check when proofreading your text.

Cultivar names are dictated by International Code of Nomenclature for Cultivated Plants

When writing, the cultivar name is added after genus or specific epithet and is put in single quotes without italicization. For example,

- *Grevillea* 'Robyn Gordon'
- *Grevillea rosmarinifolia* 'Rosy Posy'

Consistency

One of the basic rules of scientific writing is consistency. Regardless of your choice of scientific or common name, you must maintain consistency. Always check the author guidelines when preparing manuscripts. Formats for citations and references, headings, and section placement can be different. Be assured that the format for writing scientific names is internationally consistent regardless of the intended journal. The rules presented above will help.

In the next article in this series, we will discuss tips on how to write scientific names of bacterial species in a journal manuscript.

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You see that the common name of the species you are studying has several variations depending on the geographic area. Which do you use and why? What other challenges do you face when using scientific nomenclature? Please share your thoughts with us in the comments section below.

Category

1. Manuscripts & Grants
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Author
daveishan

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