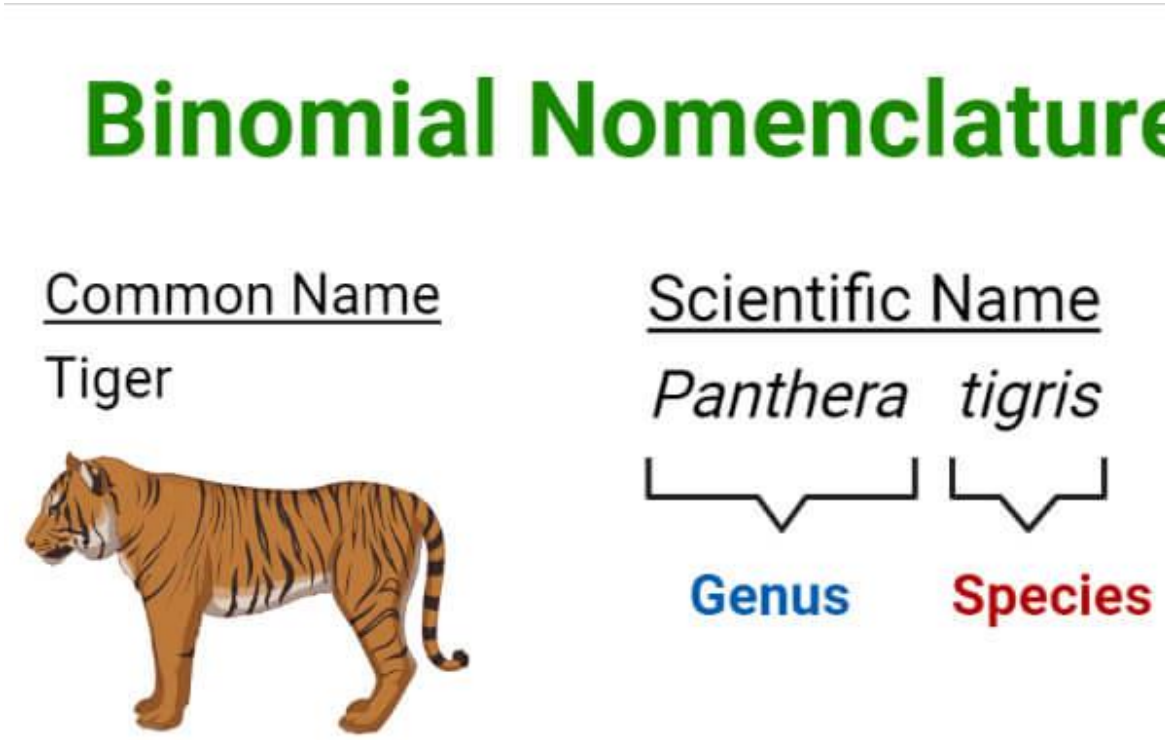


Concept of Binomial Nomenclature

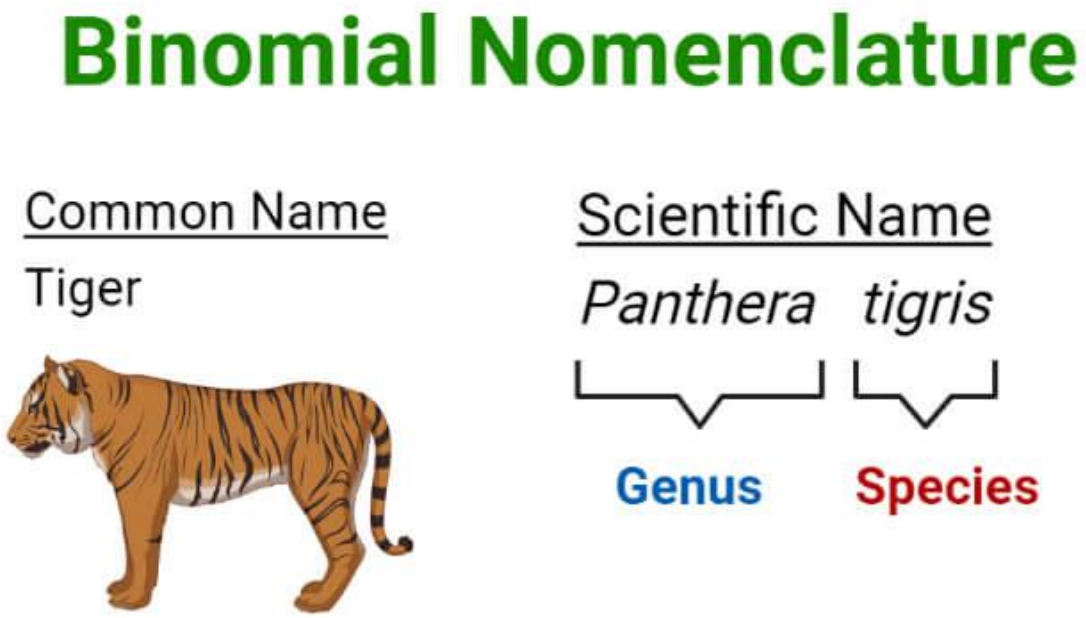
Dr. Rupesh B. Yadav

Asst. Prof.

TCSC Mumbai

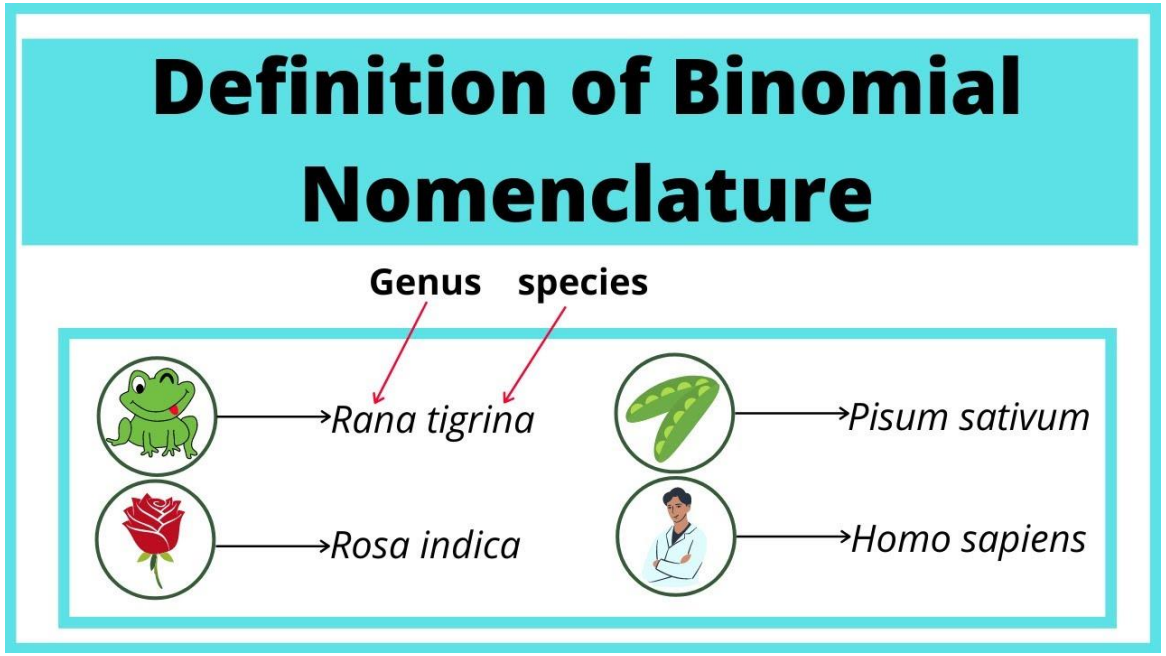
What is Binomial Nomenclature???

- "Binomial nomenclature is the biological system of naming the organisms in which the name is composed of two terms, where, the first term indicates the genus and the second term indicates the species of the organism."



Binomial Nomenclature

- Nomenclature is the system that provides certain rules and regulations set by a committee or organization to provide a certain unique identity in terms of name to any organism.
- In the scientific study, the nomenclature is done after identifying and classifying an organism based on its specific characteristics which distinguish it from other organisms.

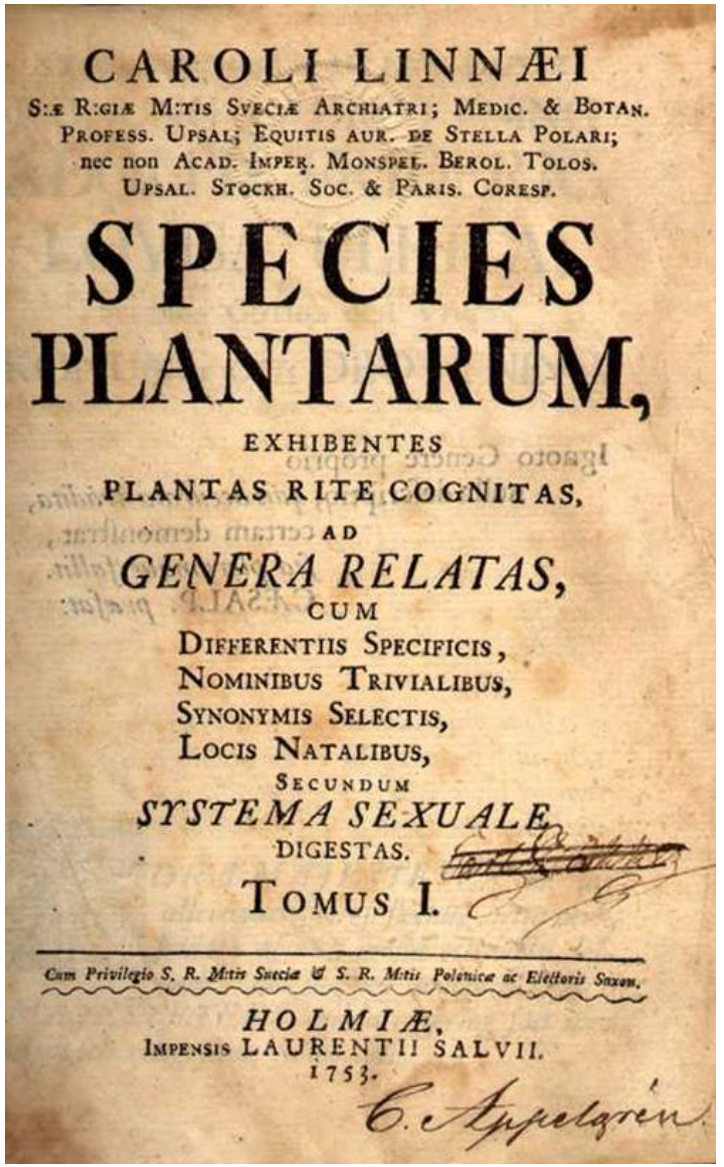


History of Binomial Nomenclature

- The pioneer of binomial nomenclature was Casper Bauhin.
- It was first used or made popular by Swedish botanical taxonomist Carolus Linnaeus in the 1700s & after that was used many other biologists.
- That's why he is also known as the father of taxonomy.
- One of his popular books based on nomenclature was "Systema Naturae".

History of Binomial Nomenclature

- He published scientific names of almost 6000 or more plants and 4000 or more animals.
- Among the different editions of publications of Carl Linnaeus, scientific names in the publications of 1753 for plants (Species Plantarum) and 1758 for animals (Tenth edition of Systema Naturae) were considered valid.
- Binomial Nomenclature was further developed and carried on by different scientists who worked on classification and evolution such as Jean Baptiste de Lamarck, Ernst Haeckel, and others.


CAROLI LINNÆI
S:Æ R:GIÆ M:TIS SVECIÆ ARCHIATRI; MEDIC. & BOTAN.
PROFESS. UPSAL; EQUITIS AUR. DE STELLA POLARI;
nec non ACAD. IMPER. MONSPEL. BEROL. TOLOS.
UPSAL. STOCKH. SOC. & PARIS. CORESP.

SPECIES PLANTARUM,

EXHIBENTES
PLANTAS RITE COGNITAS,
AD
GENERA RELATAS,
CUM
DIFFERENTIIS SPECIFICIS,
NOMINIBUS TRIVIALIBUS,
SYNONYMIS SELECTIS,
LOCIS NATALIBUS,
SECUNDUM
SYSTEMA SEXUALE
DIGESTAS.

TOMUS I.

Cum Privilegio S. R. M:tis Sueciæ & S. R. M:tis Poloniæ ac Electoris Saxon.

HOLMIÆ,
IMPENSIS LAURENTII SALVII.
1753.

How does Binomial Nomenclature Work?

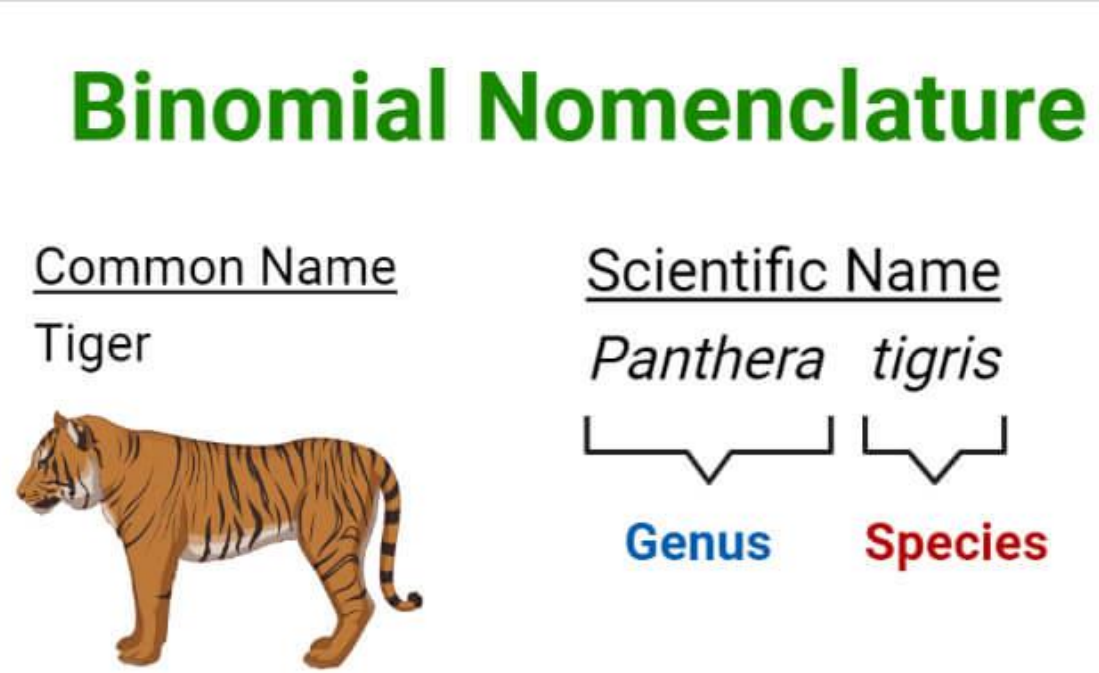
- Binomial Nomenclature is formulated under certain rules by different scientists or scientific communities.
- These names are based on different codes made by different committees such as
  - International Code for Botanical Nomenclature for Plants
  - International Code for Zoological Nomenclatures for Animals
  - International Code for Nomenclature of Bacteria
  - International Code of Virus Classification Nomenclature
  - International Code of Nomenclature of Cultivable plants and others.

How does Binomial Nomenclature Work?

- The rules or regulations made by these committees are followed universally in the scientific naming of different organisms.
  - Organisms are assigned with a name containing two words.
  - The first word or generic name is be based on the genus of the organism.
  - The second word or specific epithet is based on the species of the organism.
  - The genus can be similar containing different species of organisms.
  - Species are unique and every organism will have a different species name.
  - For eg. *Plasmodium falciparum* and *Plasmodium vivax* have the same genus name *Plasmodium* but different species names i.e. falciparum and vivax.

Rules of Binomial Nomenclature

- The names should contain two words.
- The names should be derived or adopted from the Latin language.
- The first letter of the generic name should be capital and the first letter of the species name should be small.
- A space is kept between two names.
- The names should be in an italic form in print or soft copy. Eg. *Homo sapiens.*



Rules of Binomial Nomenclature

- The names should be underlined separately in case of handwritten notes. Eg. Homo sapiens.
- Author name can also be included and in that case, the author name's abbreviation is written after species name with a space.
- For eg. *Magnifera indica* Linn. where Linn represents Carolus Linnaeus.
- If the first name given to any organism follows all the rules of binomial nomenclature then it is considered a valid name and the priority name even if other names are given later.
- The names given later will only be considered as a synonym.
- It is called the priority law.

Binomial Nomenclature Examples

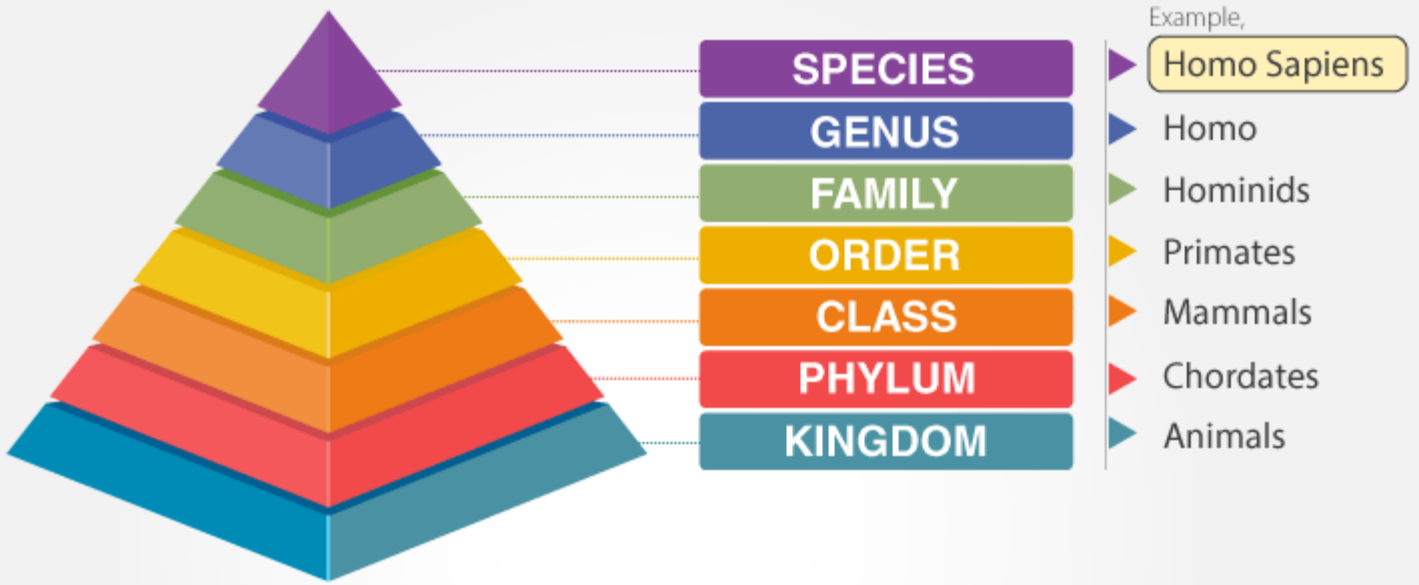
Common Name	Scientific Name	Genus	Species
Frog	*Rana tigrina*	*Rana*	*tigrina*
Human	*Homo sapiens*	*Homo*	*sapiens*
Tiger	*Panthera tigris*	*Panthera*	*tigris*
Dog	*Canis familiaris*	*Canis*	*familiaris*
Pig tapeworm	*Taenia solium*	*Taenia*	*solium*
Roundworm	*Ascaris lumbricoides*	*Ascaris*	*lumbricoides*
Beef tapeworm	*Taenia saginata*	*Taenia*	*saginata*
Rice	*Oryza sativa*	*Oryza*	*sativa*
Mango	*Magnifera indica*	*Magnifera*	*indica*

Binomial Nomenclature Applications

- In biological studies, organisms are assigned with some distinguishable specific scientific names, and bionomical nomenclature is applied for it.
- It helps in the systematic scientific studies of different organisms.
- Based on specific characteristics, it can be used to provide scientific names to pre-existing or newly discovered organisms.
- Some of the scientific names can easily indicate the general identification or characteristics of any organism. Eg. *Entamoeba coli* where “Entamoeba” indicates it to be enteric amoeba and “coli” indicates its presence in the colon of the intestine.
- The common name of organisms may vary around different parts of the world based on their language but the scientific name remains the same which makes it easier for biologists around the world to recognize it.

Binomial Nomenclature Limitations

- It includes species name along with genus but nowadays further classification leads to subspecies i.e. three names or trinomial nomenclature that is not included in binomial nomenclature. Eg. *Homo sapiens* sapiens for humans.
- Priority law leads to the limitation of using the first name as a priority if they are valid although the names assigned later may be more suitable. But the later assigned names are just considered synonyms.
- The names are mostly unfamiliar to common people.
- These names can be harder to remember for every organism as they are long and different.



- It is a method of giving each species a name consisting of two words.
- The first name is generic name which is the name of genus and second name is the name of species, i.e. specific name.
- Genus name is written by capital letter and species name is written by small letter.
- Both names should be underlined or should be written in italic form.

Thank You