

## Lesson 4

# TAXONOMY and NOMENCLATURE

Taxonomy is the science of discovering, describing, naming and classifying new organisms, and identifying already known ones.



# TAXON

A taxon (taxonomic unit) is a name assigned to an organism or group of organisms.

\* A taxon is also designated as a rank and can be placed at a particular level in a systematic hierarchy, and reflecting evolutionary relationships.

\*It can be used to indicate the rank of a group as well as the organisms contained within that group as was seen under classification.

\* The two most important aspects under classification is taxanomy and nomenclature.

# **BIOLOGICAL NOMENCLATURE**

\*This deals with the application of correct scientific names to organisms according to nomenclatural system.

\*The purpose of a name is to act as an easy means of reference and as an aid to communication.



The criteria for formally naming plants and animals are based on the rules and recommendations of the International Code of Botanical Nomenclature (ICBN) and International Code of Zoological Nomenclature (ICZN) respectively.



# Characteristics of names:

Names impart some information about organisms. Eg. leaf shape, flower color, location, root feature, etc.

eg. *Manihot esculentus*

\*The use of a name avoids the use of a descriptive phrase.



# Systems of nomenclature

## **1. Polynomial system**

This system is NOT IN USE/obsolete.

\*Under this system a name was made up of a single word for an organism, followed by a lengthy list of descriptive terms in Latin.

eg. *Ranunculus calycibus retroflexis,*  
*pedunculis falcatis, caule erecto,*  
*folius compositis.*

*meaning,*  
*the buttercup with reflexed sepals,*  
*curved flower stalks, erect stem,*  
*and compound leaves).*



*Another example;*

*Mentha floribus spicatis, foliis  
oblongis serratis*

*Meaning ?????*

Mentha (mint) with flowers in a  
spike, leaves oblong and serrated

## Weakness in polynomial system.

\*The use of polynomials was discontinued because

- (i) different polynomials existed for the same plant, making them cumbersome to remember
- (ii) they were not standardized
- (iii) they served as labels for the taxon and at the same time as diagnosis of the species.

## 2. Binomial system

This system was first used by Linnaeus in his famous and influential treatises, *Genera Plantarum* (1737) and *Species Plantarum* (1753).

\*In the binomial system a species name consists of two words, a generic name and a specific epithet. E.g. *Vigna unguiculata*.

\*Generic names are usually singular nouns and are, with certain optional exceptions, written with a capital letter/initial.

\*Specific names/epithet is a bit descriptive and starts with small letter

\*In addition, the generic names and specific epithets are italicized when in text or underlined when hand written.

\*While the generic name can be used to represent all the species in the genus, the specific epithet cannot be used to represent any species because it does not convey any sense when used alone.

\*Two or more members of a genus may be referred to by using the generic name together with the abbreviation spp. eg. *Strophantus* spp.

\*A single species of a genus may be referred to by using the generic name followed by the abbreviation sp. e.g. *Strophantus* sp.

\*Instead of repeating a generic name several times in a paragraph, it is abbreviated to the initial letter after it has been written fully for the first time. Eg. *S. barteri*.



## Scientific Names

Latin is the language of biological nomenclature.

To this end all scientific names must be in Latin or Latinised.

Advantages are as follows:

➤ This overcomes the difficulty of multiplicity of different languages which makes common names confusing and unsatisfactory.



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- Latin was the common language of learned men in Europe, where formal botany originated and developed.
- Linnaeus himself was born Carl von Linne, which he latinized to **Carolus Linnaeus**, a practice common among scholars of the time.

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➤ Latin is essentially a “**dead**” language –

Ie.

➤ it is no longer spoken as a native tongue by any people, #

➤ avoiding elements of national bias and jealousy,

➤ and, words are no longer being added or subtracted to the language.

# **REGULATION OF SCIENTIFIC NAMES**

- Scientific names are universal, precise and often help infer certain character details and interrelationships of the taxa concerned.
- They are governed by rules captured in the International Code of Zoological Nomenclature (ICZN) and the International Code of Botanical Nomenclature (ICBN).

# 1. International Code of Botanical Nomenclature (ICBN)

- In 1867, a group of botanists at the International Botanical Congress in Paris established the rules governing plant nomenclature and classification.
- They established Species Plantarum as the starting point for scientific names and, through **the International Code of Botanical Nomenclature**, formalized and standardized plant naming procedures and rules.

- The **code** was divided into **three divisions**.
- **Division I** contains a set of six principles which form the very basis of the system of nomenclature (ie. both zoological and botanical).
- These are:
  - Scientific names of taxonomic groups are treated as Latin regardless of their derivation.
  - Botanical nomenclature is independent of zoological nomenclature..

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

➤ The rules of nomenclature are retroactive unless expressly limited.

- Division II contains detailed rules, distributed over 75 articles, and recommendations. Names which contravene any one or more of the rules are illegitimate and cannot be maintained.

- Recommendations deal with subsidiary points and are intended to bring in greater uniformity in plant nomenclature.
- Names contrary to recommendations need not be rejected, but are not examples to be followed.
- Division III contains detailed provisions for modification of the Code.



## 2. International Code of Zoological Nomenclature (ICZN)

- In 1901, a report by the International Commission on Zoological Nomenclature (ICZN) was adopted at a congress and a Code of rules embodying the decision of that Congress was published in French, English and German in 1905.

- This Code, entitled Règles internationales de la Nomenclature zoologique.
- This code underwent a series of amendments at subsequent Congresses.
- In 1961 it was replaced in its entirety by the first edition of the International Code of Zoological Nomenclature.

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- The International Commission on Zoological Nomenclature (ICZN) was established in 1895 to create, publish and, periodically, revise the International Code of Zoological Nomenclature.

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- Commission also considers and rules on specific cases of nomenclatural uncertainty. These rulings are published as 'Opinions' in the *Bulletin of Zoological Nomenclature*.

# COMMON NAMES

- Common names are very often descriptive and poetic references to plants.
- They are not suitable for biological nomenclature **because:**
  - They may refer to more than one plant or, conversely, many plants may have the same common name.

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- Common names are often ambiguous and often regional or local, rarely universal.
- They are available for only relatively a few plant and animal species.
- The same taxonomic group may be known by different names in different linguistic areas and even in different parts of the same area.

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(ii) *Arbutus unedo* has many different common names including osage orange, mock orange, wild orange and horse apple.

(b) They are often ambiguous.

(c) They are not universal but often regional or local.

(d) They are available for only relatively a few plant and animal species.

(e) Most common names do not give any information about the organisms. In some cases the information given is **misleading**.

E.g. (i) Jerusalem cherry is a woody plant with berry fruits. Its fruit is not cherry and does not come from Jerusalem.

(ii) Pineapple is neither a pine nor an apple.

(f) Common names do not indicate any relationship with other organisms.



# THANK YOU



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