Introduction to Systematic Botany

Some definitions

- Systematic botany: the science which treats the classification of plants, and the terms which are employed in their description and denomination. So the correct option is "Methodical study of plants, dealing with identification, nomenclature and classification".
- Plant taxonomy: the science that finds, identifies, describes, classifies, and names plants
- Classification: systematic arrangement in groups or categories according to established criteria.
- Identify: to recognize or be able to name someone or something, or to prove who or what someone or something is.
- Taxon: (plural Taxa) is a group of one or more populations of an organism or organisms seen by taxonomists to form a unit. Although neither is required, a taxon is usually known by a particular name and given a particular ranking, especially if and when it is accepted or becomes established.
- Nomenclature: It is the aspect of taxonomy that deals with the orderly application of names to taxa.
- **Description:** It is the listing of morphological traits or characteristics.
- **Diagnosis:** scientific determination; a description that classifies a group or taxon precisely.



Objetives

- To make an inventory of the world's plants.
- To provide a method for identification and communication.
- To produce a coherent and universal classification system.
- To demonstrate the evolutionary implications of plant diversity.
- To provide a single "scientific" name for every plant and plant group in the world.



Plant Systematics Phases



The Pioneer Phase

- Also called "alpha taxonomy"
- This is the discovery and collection phase





The Consolidation Phase

This is the synthesis phase mostly based on morphology. This phase deals with the study of the plant material in the field as well as in the herbarium. All the new groups, if invented, are described.



The Experimental or Bio-Systematic Phase:

This deals with a wide variety of things and a more thorough knowledge of a taxon based on analysis of a wide variety of things such as the geographical variation, chemical studies, cytogenetic studies, physiological features, fertility relationships, evolutionary patterns and other population studies.



Botanical Nomenclature



Bases for Scientific Names

The basis is found in the common names used in ancient Greece and Rome.



Scientific Names vs. Common Names

Why do botanists use scientific names instead of common names?

Plant Legend				
Symbol	Qty	Common	Botanical	
٢	IJ	Azalea - Yellow Flame	Rhododendron 'Yellow Flame'	
*	36	Leucothoe	Lucothoe Fontanesíana	
*	29	Nandína	Nandina Domestica	
	6	Rhododendron - Catawba	Rhododendron Catawbiense	
۲	18	Azalea - Shammarello	Rhododendron 'Shammarello'	
٩	14	Azalea - Shammarello	Rhododendron 'Shammarello'	
۲	チ	Atlas Cedar	Cedrus líbaní atlantica	
۲	25	Sugar Maple	Acer Saccharum	
8	ĩ	Tropical Hibisous	Hibiscus rosa-sinensis	
*	66	Azalea -Balzac	Rhododendron 'Balzac'	
\bigcirc	95	Azalea - Knap Hill Exbury	Rhododendron 'Knap Hill Exbury'	

Common names may be totally different from one country to another, from one state to another, and even from one county to another. Common names change as new people move to an area, or as old common names fall out of favor for one reason or another.

Composition of Scientific Names

Binomial naming

Every species has a unique scientific name that consists of two parts (binomial)—its genus and species names.







Principles of Botanical Nomenclature

- Botanical nomenclature is independent of zoological, bacteriological, and viral nomenclature.
- A botanical name is fixed to a taxon by a type.
- A guiding principle in botanical nomenclature is priority, the first publication of a name for a taxon.
- The intent of the Code is that each taxonomic group ("taxon", plural "taxa") of plants has only one correct name that is accepted worldwide, provided that it has the same circumscription, position and rank.
- Names of taxa are treated as Latin.
- The rules of nomenclature are retroactive unless there is an explicit statement that this does not apply.

Taxa Ranks

The taxonomic hierarchy is a system of ranks of categories to which names are associated.

L.				
Type species				
Ochus.	L.			
Genus:	Zea			
Subtribe:	Tripsacinae			
Tribe:	Andropogoneae			
Supertribe:	Andropogonodae			
Subfamily:	Panicoideae			
Family:	Poaceae			
Order:	Poales			
Clade:	Commelinids			
Clade:	Monocots			
Clade:	Angiosperms			
Clade:	Tracheophytes			
Kingdom:	Plantae			

Method of Type

- Names are established with reference to a nomenclatural type.
- The nomenclatural type is a type specimen, which is a single specimen or plants from a single herbarium slide.
- Taxonomists employ the type method as a legal mechanism for assigning the correct name to a taxon.



Description of a Species New to Science

When collecting a species new to science, the following steps should be followed:

- Give it a name
- Prepare a diagnosis or description
- Designate a nomenclatural type
- Publish the name and description



Kinds of Type

- holotype the single specimen or illustration that the author(s) clearly indicated to be the nomenclatural type of a name
- lectotype a specimen or illustration designated from the original material as the nomenclatural type when there was no holotype specified or the holotype has been lost or destroyed
- isotype a duplicate of the holotype
- syntype any specimen (or illustration) cited in the original description when there is no holotype, or any one of two or more specimens simultaneously designated as types
- paratype any specimen (or illustration) cited in the original description that is not the holotype nor an isotype, nor one of the syntypes
- neotype a specimen or illustration selected to serve as nomenclatural type if no material from the original description is available
- epitype a specimen or illustration selected to serve as an interpretative type, usually when another kind of type does not show the critical features needed for identification

Principles of Plant Taxonomy



Categories

In order to communicate and classify the vast number of plants, systematists assign names and order plants within a hierarchy of categories.



Species

It is the basic unit of classification and a taxonomic rank of an organism, as well as a unit of biodiversity.



Genus

Sets of closely related species.



Family

- Aggregates of species that are similar in reproductive and vegetative characteristics.
- The family names of plants end with the suffix "-aceae"





Order

- They include one or more families.
- Suffix- ales





Thank you for watching



dm.sandoval95@gmail.com

