

LECTURE 5: Introduction to the principles of plant taxonomy

a. Definition of plant taxonomy

Taxonomy can be defined as a study aimed at producing a system of classification of biological organism, which best reflects the totality of their similarities and differences.

Taxonomy is the study and description of the variation that exists among organisms the investigation of the cause and consequence of these variations and the use of the data obtained for identifying the variants and the causes of these variations to produce a system of classification. If it is applied to plants, it is called **plant taxonomy**.

Importance of plant taxonomy

1. it provides inventory on the world of plant floral
2. it provides method of identification of plants and communication in plant science.
3. It produces a co-herent and universal system of classification of plants.
4. It demonstrates the evolutionary implication of plant diversity.

Aims of plant taxonomy

The aims of plant taxonomy are three-fold

1. To provide a convenient method of identification and communication
2. To provide a classification which as far as possible express the natural relationship of organisms
3. To detect evolution at work, discovering its processes and interpreting its results.

The aims can be summarized as to produce a system of classification through the study and understanding the origin of the organisms and tracing the phylogenetic relationships between the organisms.

Scope of Taxonomy

There are three inter-related aspects of taxonomy

1. Identification
2. Nomenclature
3. Classification

1. Identification: it deals with the determination of a taxon as being identical with or similar to another and already known organism.

- a. It is also the naming of a plant by a reference to an already existing classification.
- b. It must be known that identification precedes naming. It is from the different features or characteristics of a system of identification that an organism desires its name.

1 Nomenclature: It is also clear that a set of methods, rules, interpretations etc are considered when naming an organism. Therefore, when a researcher/scientist interests at a point in the study of these rules in the course of naming a plant, this exercise is called Nomenclature.

Nomenclature deals with the determination of the correct name of the organisms and is governed by international Code of Botanical Nomenclature (ICBN). It permits only a single valid name for each plant.

2 Classification:- It is the placing of plants in group or categories according to particular plan or system of classification can be viewed in two perspectives, as a process and also as a concept.

As a process:- is the production of a reasonable/logical system on itself is such that allows for easy reference to be made about its components.

As a concept:- Classification is seen as an entity that is made up of many members.

Basically, there are two systems of classification: **natural and artificial classifications**

Artificial classification is based on a few convenient characters for the purpose of identification. Artificial system of classification does not group organism most alike in their genetic constitution. It has little or no predictive value. It is a special purpose classification chosen to suite the purpose for which it is designed e.g. plants can be classified on the basis of habit as trees, shrub or herbs. Also animal into two groups on the basis of a single trait i.e presence or absence of a trait.

Natural system of classification : it groups organisms most closely related phylogenetically and takes genetic constitution of an organism into account. It has predictive value and is based on total similarities. Now-a-days there are new ways of testing differences e.g chromosome, morphology immunological reaction, nutrient required etc.

PLANT NOMENCLATURE

Man has always been a nomenclaturist. He has used names for plants, animals and objects and has classified plants, animals and other objects with or without special terminology or system.

You can ask why do we need such difficult *Latin* names for plants? Why not in local languages'?

According to Benson (1962), vernacular or common names cannot replace scientific names due to the following reasons:

- Names in common languages are not universal.
- In most part of the world, relatively few species have common names in any language
- Common names are applied indiscriminately to species or varieties.
- Two or more related plants are known by the same name or single species may have two to several common names applied either in the same or different localities e.g in Nigeria, Raphia palm: Yoruba- Ogoro, Ibo-Ngwo or Agwo, Efik-Ukot. So you can see the inconsistency in the use of local names.

With the rapid increase in the number plants and animal known to man, it has become apartment that there should be some guiding rules which will have uniformity, consistency and precision in naming plants. In Botany/ plants, these rules are governed by ICBN. The rules ensure stability and accuracy in the application of names.

Binomial System of Nomenclature

The BSN was suggested by Carlous Linnaeus (1753). In this system, there are two components of scientific names and the scientific name of a plant is a binary combination of the two components

1. The generic name
2. The specific epithet

The generic name:- is the name given to the genus while to the species is called specific name/epithet. The generic name begins with a capital letter and the species name with small letter. The scientific names are italicized in print or underlined when typed or hand written e.g *Glycine max* - is the scientific name for soybean and *Dioscorea rotandata* is the botanical name

for white yam, Therefore, *Glycine* and *Dioscorea* are the representative of generic names and *max* and *rotundata* are the specific epithets.

According to ICBN, there can be only one group of plant with the generic names e.g *Manihot*. Within each genus, there can be only one valid specific epithet which may apply to plants of different germs e.g *Manihot esculentus*, *Abelmoscus esculentus*.

Citation and Authority

Since every taxon (may it be family, genus or species) is originally described and published by one or two persons, so the name of the persons written after the specific epithet is known as the **authority of that taxon or name**. The authority of that taxon or name i.e the author's name may be written out completely or it may be abbreviated. Thus sweet potato plant (*Solanum tuberosum*) was first named and described by Carlous Linnaeus, so Linnaeus becomes the authority for the name and it is written as *Solanum tuberosum* L when the rank of a plant is changed or when a species is transferred from one genus to another, the name of the original by the name of the original author is placed in parenthesis and is followed by the name of the person making the change e.g *Medicago polymovpha* variety or bicularis was first described by Linnaeus. Later on it was raized to the rank of a species by Allioni and thus it became *Medicago orticularis* also, *Abelmoscus esculentus* (L) Moaench, *Vigna ungniculata* (L) Walp.