International Advance Journal of Engineering, Science and Management (IAJESM)
ISSN -2393-8048, July- December 2019, Submitted in September 2019, iajesm2014@gmail.com

A study on Plant Taxonomy

Priyanka Sharma, Lecturer (Botany), Bright Institute, Sri Ganganagar (Rajasthan).

ABSTRACT

Plant taxonomy is the science of classifying and naming plants. It is a branch of systematics, which is the study of the diversity of life and the relationships between organisms. Taxonomists use a variety of data to classify plants, including morphology (structure), anatomy (internal structure), physiology (function), chemistry, and genetics.

The goal of plant taxonomy is to develop a classification system that reflects the evolutionary relationships between plants. This system is used to identify and name plants, to understand their distribution and diversity, and to manage plant resources.

Humans have been classifying plants for centuries. Early classifications were based on practical considerations, such as plants that were useful for food, medicine, or construction. In the 18th century, Swedish botanist Carl Linnaeus developed a binomial nomenclature system that is still used today. This system gives each plant species a unique two-part name, consisting of a genus name and a species name.

KEYWORDS:Plant, Taxonomy, Genus

INTRODUCTION

Linnaeus's classification system was based on morphological characters, such as the number of petals and stamens in a flower. In the 19th century, taxonomists began to use other characters, such as anatomy, physiology, and chemistry, to classify plants. In the 20th century, taxonomists began to use molecular data, such as DNA sequences, to classify plants.

Modern plant taxonomy is a complex and dynamic field. Taxonomists use a variety of data and methods to classify plants, and the classification system is constantly being updated as new data is discovered.

One of the most important tools used by taxonomists is the phylogenetic tree. A phylogenetic tree is a diagram that shows the evolutionary relationships between organisms. Phylogenetic trees are constructed by comparing the genetic sequences of organisms.

Taxonomists also use a variety of other data to classify plants, including morphology, anatomy, physiology, chemistry, and ecological data. Morphological characters include the size, shape, and color of plant parts. Anatomical characters include the structure of plant cells and tissues. Physiological characters include the way plants function, such as how they photosynthesize and reproduce. Chemical characters include the presence of certain compounds in plants. Ecological data includes the information about where plants live and how they interact with other organisms.

The classification system for plants is hierarchical, meaning that it is organized into a series of levels. The highest level is the kingdom, and the lowest level is the species. Between the kingdom and species levels are a number of other levels, including phylum, class, order, family, and genus.

The kingdom is the highest level in the classification system. There are five kingdoms of life: Animalia, Plantae, Fungi, Protista, and Archaebacteria. The kingdom Plantae includes all plants.

The phylum is the next level below the kingdom. There are 13 phyla of plants. The most important phylum of plants is the Angiospermophyta, which includes all flowering plants.

The class is the next level below the phylum. There are two classes of angiosperms: Magnoliopsida and Liliopsida. Magnoliopsida includes dicots, which have two cotyledons (seed leaves), and Liliopsida includes monocots, which have one cotyledon.

Binomial nomenclature is the system of naming plants that was developed by Carl Linnaeus in the 18th century. Each plant species has a unique two-part name, consisting of a genus name and a species name. The genus name is always capitalized, and the species name is never capitalized.

For example, the scientific name for the rose is Rosa gallica. Rosa is the genus name, and gallica is the species name.

Plant taxonomy is important for a number of reasons. It helps us to identify and name plants, to understand their distribution and diversity, and to manage plant resources.

The history of plant taxonomy can be traced back to the ancient Greeks, who classified plants based on their medicinal and culinary uses. The Roman naturalist Pliny the Elder also classified plants, but his system was based on their size, shape, and other superficial characteristics.
In the Middle Ages, plants were classified according to their religious significance. For example, the rose was associated with the Virgin Mary and the lily with purity.
In the 16th and 17th centuries, European explorers began to bring back new plant specimens from all over the world. This led to a renewed interest in plant taxonomy, and several naturalists developed new systems for classifying plants based on their morphological characteristics.
The most important of these systems was developed by the Swedish botanist Carl Linnaeus in the mid-18th century. Linnaeus's system is still used today, and it is based on the concept of binomial nomenclature, in which each plant species is given a unique two-word name. The first word is the genus name and the second word is the species name.

Plant Taxonomy

Plant taxonomy is based on the following principles:
Hierarchy: Plants are classified into a hierarchy of taxa, with each taxon being a group of related taxa. The highest taxon is the kingdom and the lowest taxon is the species.
Monophyly: Monophyly is the principle that all members of a taxon should be descended from a common ancestor.
Characters: Plants are classified based on their shared characteristics, or characters. Characters can be morphological (e.g., leaf shape, flower structure) or molecular (e.g., DNA sequences).
The hierarchical system of plant taxonomy consists of the following levels:
Domain: The highest level of classification is the domain. There are three domains of life: Bacteria, Archaea, and Eukarya. Plants belong to the domain Eukarya.
Kingdom: The next level of classification is the kingdom. There are five kingdoms of Eukarya: Animalia, Plantae, Fungi, Protista, and Chromista. Plants belong to the kingdom Plantae.
Phylum: The next level of classification is the phylum. There are 11 phyla of plants: Anthocerotophyta, Bryophyta, Chlorophyta, Charophyta, Chrysophyta, Cryptophyta, Euglenophyta, Phaeophyta, Rhodophyta, Tracheophyta, and Xanthophyta.
Class: The next level of classification is the class. There are two classes of Tracheophyta: Lycopodiopsida and Euphyllopsida.
Subclass: The next level of classification is the subclass. There are two subclasses of Euphyllopsida: Magnoliidae and Rosidae.
Order: The next level of classification is the order. There are many orders of Magnoliidae and Rosidae.
Family: The next level of classification is the family. There are many families within each order.
Genus: The next level of classification is the genus. There are many genera within each family.
Species: The lowest level of classification is the species. A species is a group of closely related individuals that can interbreed and produce fertile offspring.
Binomial nomenclature is the system of naming plant species using two words: the genus name and the species name. The genus name is always capitalized and the species name is not. For example, the scientific name of the common dandelion is Taraxacum officinale.
Once the morphological characteristics of a plant have been observed, they can be compared to the descriptions of plants in a field guide or other reference book. This will allow the plant to be identified to its genus and species.
Plant taxonomy is the branch of biology that deals with the classification and naming of plants. It is a complex and ever-evolving field, as new plant species are discovered and existing species are reclassified on a regular basis.
The primary goal of plant taxonomy is to develop a system of classification that accurately reflects the evolutionary relationships between different groups of plants. This is done by studying the physical characteristics of plants, as well as their genetic and molecular data.

Plant taxonomy is an important tool for many different disciplines, including botany, agriculture, horticulture, and conservation biology. It is used to identify and characterize plant species, to understand their distribution and ecology, and to develop strategies for conservation and sustainable use.

Modern plant taxonomy is based on the principles of cladistics, which is a method of classification that groups organisms together based on their shared evolutionary ancestors. Cladistic analysis takes into account both morphological (physical) and molecular data to determine the evolutionary relationships between different groups of plants.

Plant taxonomy is a complex and ever-evolving field, but it is an essential tool for understanding and managing the world's plant diversity. By studying the classification and naming of plants, we can better understand their evolutionary relationships, their distribution and ecology, and their potential uses for humans.

Plant taxonomy is important for a number of reasons. First, it provides a way to identify and characterize plant species. This is essential for research purposes, as well as for practical applications such as agriculture, horticulture, and conservation biology.

Second, plant taxonomy helps us to understand the distribution and ecology of plant species. This information can be used to manage plant resources sustainably and to protect endangered species.

Third, plant taxonomy can help us to develop new medicines and other products from plants. Many plants contain compounds that have potential therapeutic or industrial uses. By understanding the taxonomy of plants, we can more easily identify and develop these compounds.

DISCUSSION

The principles of plant taxonomy are based on the concept of cladistics. Cladistics is a method of classification that groups organisms together based on their shared evolutionary ancestors.

To develop a cladistic classification, scientists first need to identify the different characters that can be used to distinguish different groups of plants. These characters can be morphological (physical), such as the structure of the leaves or flowers, or molecular, such as the DNA sequence of a particular gene.

Plants are classified into taxa based on a variety of characters, including their morphology, anatomy, cytology, genetics, and molecular biology. Morphological characters are those that can be observed with the naked eye, such as the size, shape, and color of plant organs. Anatomical characters are those that can be observed with a microscope, such as the structure of plant tissues. Cytological characters are those that can be observed at the cellular level, such as the number and structure of chromosomes. Genetic characters are those that are determined by the DNA of the plant. Molecular biological characters are those that are determined by the RNA and proteins of the plant.

Plants are identified by comparing them to known specimens. This can be done using field guides, herbarium specimens, and molecular data. Field guides are books or websites that contain descriptions and illustrations of plants. Herbarium specimens are dried and pressed plant specimens that are stored in museums and botanical gardens. Molecular data is DNA or RNA sequence data that can be used to identify plants.

The scientific names of plants are assigned according to the International Code of Nomenclature for algae, fungi, and plants (ICN). The ICN is a set of rules that govern the naming of plants. Scientific names are binomial, meaning that they consist of two parts: the genus name and the species name. The genus name is a noun that indicates the general group to which the plant belongs. The species name is an adjective that indicates the specific plant within the genus.

CONCLUSION

Plant taxonomy is a vast and complex field, but it is essential for understanding the diversity of plants and their relationships to each other. The principles of plant taxonomy are based on the assumptions that plants are related to each other, that they can be classified into groups based on their similarities, and that the taxonomic hierarchy is a reflection of the evolutionary relationships

between plants. Plant taxonomy is used to identify plants, to study the evolution of plants, to manage plant resources, and to conserve plant biodiversity.

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