

SYSTEMATICS OF ANGIOSPERMS

INTRODUCTION

Systematics is concerned with the study of diversity of plants, their naming, classification, and phylogeny. Now a days, the term systematics and taxonomy has become synonymous. Some authors, however, prefer to differentiate between them, giving systematics a broader coverage and restricting taxonomy to the study of classification.

[Taxonomy originated from Greek words, taxis - arrangement, nomos - laws].

According to a conservative estimate, the number of described species of plants in the world is over 4,00,000. Of these, about 2,86,000 belong to the flowering plants. People have tried to group all the known species since the early stages of civilization. The recorded history of classification begins with Theophrastus (370-278 B.C.), the Father of Botany. He described about 500 plants and his work resulted the development of formal taxonomic groups. The earliest systems of classification were based on gross structural resemblances - such as herbs, shrubs and trees. Later the gross morphology were taken into consideration to classify the plants. With the advancement of knowledge and the discovery of microscope in the beginning of seventeenth century, anatomical data were also used in the classification. The morphological and anatomical characteristics, coupled with increasing knowledge of geographical distribution came to the climax by the end of the nineteenth century. The systematics took a major shift with the arrival of Darwin's theory of evolution in 1859. Taxonomists began to correlate

②

The taxa with each other and the evolutionary aspects were discussed at great length. The rediscovery of Mendel's law also got significance and cytological as well as genetical data were used to find the phylogenetic relationship of the taxa. During 1960s and thereafter, several branches like chemotaxonomy, numerical taxonomy etc. came in use and data obtained from them formed the basis to analyse the information with the help of electronic gadgets.

AIMS OF SYSTEMATICS

- ① The primary aim of systematics is to describe and provide a convenient method of identification.
- ② Properly identified specimens are given names which are acceptable to the whole world.
- ③ The taxonomists also provide a system of classification which is based on overall resemblances.
- ④ They also try to depict the evolutionary relationship within the group, which is commonly depicted with the help of phylogram wherein the longest branches represent more advanced groups and the shorter, nearer the base, primitive ones.
- ⑤ The systematists expected to provide new concepts, reinterpret the old, and develop new procedures for correct determination of taxonomic affinities.
- ⑥ They also provide valuable information concerning endangered species, unique elements, genetic and ecological diversity.

COMPONENTS OF SYSTEMATICS

The four basic components of systematics are -

1. Characterization
2. Identification
3. Naming
4. Classification.

All these form the basis of description of a plant.

1. Characterization: The characterization of a taxon involves listing its features by recording appropriate character states. The description is recorded in a set pattern i.e., habit, stem, leaves, Inflorescence; flower (sepals, petals, stamens, carpels), fruit etc. For each character an appropriate character state is listed. For example leaf may be simple/compound, opposite/alternate; Flower may be zygomorphic/actinomorphic; pentamerous/tetramerous/trimerous; ovary may be superior/inferior etc. The diagnostic characters help to separate a taxon from the closely related ones.

2. Identification: plant identification is the process of recognizing an unknown specimen. This is done by matching the specimen with already known taxon. Identification keys prepared by the author is used. Identified herbarium and computer aided devices are also used for the identification.

3. Naming: Nomenclature deals with the determination of a correct name for a taxon using rules and recommendations of ICBN. Single correct name is provided for each species. If the name has changed, the old name is also conserved and listed by the ICBN.

4

4. Classification: It is the arrangement of plants in taxonomic groups according to their observed similarities i.e., division, class, order, family, genus and species. Once established, a classification provides an important mechanism of information storage, retrieval and usage.

In addition to above four basic components, phylogeny is also included in most of the systematics. It is depicted through a diagram known as phylogenogram.

— x —

AHMAD MAHOOD

Further reading: 1. Plant Systematics by G. S. Chauran Singh
2. Taxonomy of Angiosperms by V. Singh & D. K. Jain.

AHMAD MAHOOD.