4.1 INTRODUCTION TO PLANT TAXONOMY

TAXONOMY: (Gk. *Taxis*=arrangement; *nomos*=rules means "arrangement by rules")

- **The science dealing with identification, nomenclature and classification of organisms, following certain rules and principles.**
- **The term taxonomy was coined by de Candolle in 1813.**
- **Linnaeus is considered as "Father of taxonomy".**
- **Santapau is considered as "Father of Indian taxonomy".**

The fundamental elements of taxonomy are as follows:

1. CHARACTERISATION AND IDENTIFICATION:

Taxonomic studies are based on comparative morphology (external appearance), anatomy (internal structure), cytology, biochemical and secondary metabolites (chemotaxonomy and biochemical taxonomy), embryology, serology, molecular biology, ecological relationships and use of computers for their evaluation. They provide information to their similarities, dissimilarities and evolutionary relationships, with already known organisms/plants.

IDENTIFICATION:

- **It is determining the correct place in a system of classification and finding out the correct name for plant**
- **Identification is carried out with the help of keys.**
- **All possible characteristic features of the different plants are studied.**
- **They are composed with the features of known species by means of keys.**
- **Identification not only assigns the organism/plant to a particular group, locates the correct name but also provides information if the plant is new to systematic and requires giving a new name.**

2. NOMENCLATURE:

It is the determination of the correct name of an organism according to established universal rules.

3. CLASSIFICATION:

It is the ordering of plants under groups or subgroups depending upon extent of similarities and differences.

AIMS OF CLASSIFICATION:

The ultimate objective of the classification is to arrange plants in such a way so as to give an idea about the sequence of their evolution from simpler, earlier and more primitive types to more complex, more recent and more advanced types in different periods of the earth.

BASIS OF CLASSIFICATION:

- **It is based on great variety of characteristics. From the taxonomis point of view, reproductive characters of a plant relating to a flower are of more permanent nature and are least affected by the changing environment than the vegetative characters (form, shape, surface, division, colour, duration and dimensions).**
- **Union of sepals, petals, stamens and carpels, epipetalous condition, placentation, hypogyny and perigyny, number of floral parts, symmetry, no. of cotyledons, presence or absence and nature of endosperm, structure of fruit and seed are the common reproductive characters used in classification.**

Out of the vegetative characters with the exceptions of a few, such as phyllotaxis, venation and the presence or absence of stipules, all the rest are discarded and seldom used.

SYSTEMATICS (Gk. *Systema*= order or sequence)

- **The branch of science dealing with identification, nomenclature, description and classification of organisms based on unique properties of every species and group of species at every level of classification.**
- **Generally, the terms systematics and taxonomy are used interchangeably but some scientists like Simpson (1961) relate them to separate field.**

According to him, Systematics is the study of diversity of organisms and all their comparative and evolutionary relationships based on comparative anatomy, comparative ecology, comparative physiology and comparative biochemistry.

- **Term Systematics was first used by Carlous Linnaeus.**