- FATHER OF BIOLOGY = ARISTOTAL
- FATHER OF BOTANY = THIOPHRUSTUS

# 1.1 WHAT IS LIVING?

Growth, Reproduction, ability to response to environment and to get a suitable response to our mind senses are some features defines living.

#### GROWTH

- All living organisms grow and increase in size and number
- Both plants and animals grow by cell division
- Cell division in plants are continuous throughout their life spam while in animals it can be seen only upto a certain age
- All over increased in body mass is considererd as growth
- Non living organism also grow their body mass

Therefore, growth is not a defining property.

#### REPRODUCTION

- Multicellular organisms reproduce through sexual means of reproduction.
- Unicellular organisms reproduce through asexual form For example
  - (1) fungi, filamentous algae and protonema of mosses through fragementation
  - (2) Bacteria, unicellular algae and amoeba through multiple division.
    - It too defines increase in size and number likewise growth



# Therefore, reproduction is not a defining property.

#### Metabolism

- All living organisms are made up of chemicals
- Chemicals are small, big, belongs to different class, size and function further form into biomolecules.
- These chemicals help in biochemical reaction being performed in our body.
- The sum total of all the reaction performed in our body is metalonism

## Therefore, it is a defining property.

Isolated metabolic reactions in vitro are not living things but living reaction.

#### Consciousness

- Ability to sense their surrounding and to response the stimuli which could be physical ,chemical and biological
- · Photoperiod affects reproduction in seasonal breeders both in plants and animals
- Humana have self consciousness.

### Therefore, it is a defining property.

## 1.2 Diversity in living organisms

- The number and type of species known and described on earth is. called biodiversity.
- Total 1.7 to 1.8 million of species are known till now.

#### Nomenclature

To solve the possible dispute

- It is only possible when animals are described correctly
  - For plants = ICBN (International Code of Beranical Nomenclature)
  - For animals = ICZN (International Code of Zoological

### simeridal intermetaliums

Given by Centilis Linnalus

Contains generic names and specific epithet.

Universal rules :

- Latinised, written in italics.
- First word is genus and next is species
- When handwritten separately underlined which denote latin
- Genus starts with capital letters and species start with small letters
- Example Mangifera indica linn.

#### Systematics

- Branch of study including different organism, their diversity and relationship between them.
- · Latin word systema means systematic arrangement of organisms.
- Systema nature is the publication of Linnaeous.
- · The scope of systaematics was later enlarged to include identification, nomenclature and classification.
- Systematics takes into account evolutionary relationship. between organisms.

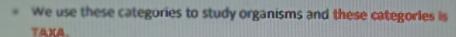
## III. Clasification

 Grouping into convient categories based on easily observable characters









- Based on characters all living organisms can be classified into different caxa which is called Taxonomy.
- Process that are basic to taxonomy:

  Character, identification, classification and nomenclature

  Earlier classification were based on the uses of various organisms.
- Modern taxonomic studies:
   External, internal structures, cell structures, developmental process, ecological information.

# 1.3 Taxonomic categories

- Each step in classification represents a rank or category called taxonomic categories and all of them make taxonomic hierarchy
- Each category is referred as unit of classification represents and is commonly known as taxon
- Group represents categories and it further represents rank/taxon
- They are biological entities not morphological aggregates

#### Species

- Smallest unit
- Group of organisms with fundamental similarities and who can inbreed.
- · Example: indica, tuberosum, leo, sapiens
- One genus may have one or more species representing different organisms but having morphological similarities.
- · Example: P. tigiris and P. leo

#### Genus

- Group of related species
- Example: solanum (potato and brinjal)
   Felis(cats)

Panther (leo, tigiris and pardus)

















#### \* Family

- Closely related genera with less number of similarities
- Characterize on both vegetative and reproductive features or plants
- solenum, ptenuia and dathura are in solanaceae family panthera and felis are in felidae family canidae is dog family

#### Order

- assemblage of families
- These are identified on the basis of aggregates of characters
- In higher taxonomic categories similarities in characters decreases
- Carnivore include felidae and canidae

#### Class

 Mammalia include order primata(monkey, gorilla, gibbon) and carnivora(tiger, cat, dog)

#### Phylum

- Divisions in plant
- Classes like amphibia, repitilia, aves, mammals are included in chordata phylum

### Kingdom

- · Highest category with no similarities
- Example: plantae

# 1.4 Taxonomical Aids

Actual specimen for primary source of taxonomic studies and

- Herbarium

Botanical Garden( Howrah, India) at national research institute Lucknow, India

### Zoological parks

- Wild animals under human care by which we can learn their food , habitats and behavior
- They are provided under similar conditions with natural habitats

#### ➢ Key

- Used for identification of plants and animals based on affinity
- Contrasting characters generally in pairs called couplet
- Result is acceptance of one and rejection of other
- · Each statement in key is called lead

- Separate taxonomic keys are required for each taxonomic category such family, genus and species for identification purposes
- Keys are generally analytical in nature

The end













- Collection of dried, pressed and preserved plant specimen and then the sheets are arranged according to classification
- Information on herbarium sheet is date and place of collection; English, local, and botanical name; family; collector name
- They are the quick referral system and became store house and repository for future use

# Biological museum

- Set up in schools, colleges and include collection of preserved pants plants and animals specimens in jars in solution formaline
- Insects are preserved in insects boxes after collecting, killing and pinning
- Larger animals are stuffed for preservation and they also contain collection of skeleton

# ➢ Botanical garden

- Collection of living plants grown for identification
- Each plant is labeled with botanical name and its family
- Some famous botanical gardens are Kew(England), Indian Botanical Garden( Howrah, India) at national research institute Lucknow, India