

CH-1 → The Living World

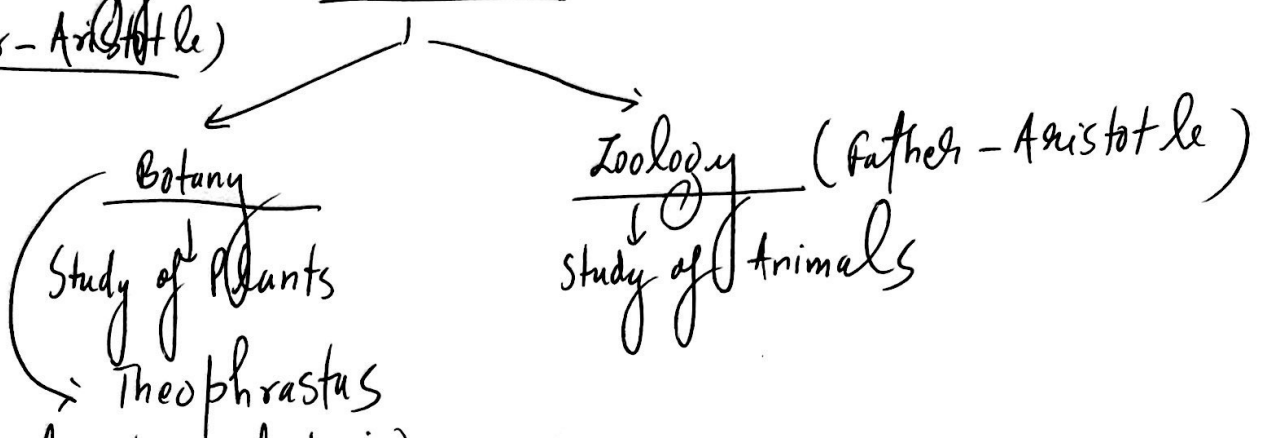
• Biology → Story of life on Earth
OR
Story of evolution of living organisms on Earth

Gr. Word → Bios + logos
 ↓ ↓
 Life Study ⇒ i.e. Study of life

→ Term: Lamarck & Travinnus.

• Biology → 2 Branches

(Father - Aristotle)



• Characteristics of living

- 1) Growth
 - 2) Reproduction
 - 3) Metabolism
 - 4) Consciousness
 - 5) Cellular interaction
- non-defining features (for 1, 2, 3)
- Defining features (for 4, 5)

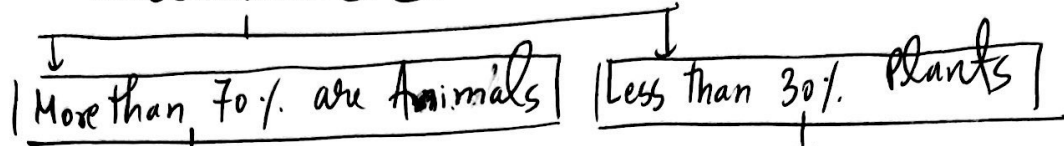
Note: ① All Above characteristics are "Unique to Living Organisms"

② Both living & non-living things are m/p same materials so they obey similar physio-chemical laws.

① Biodiversity

→ no. & types of organisms +nt on earth

* Total no. of known & described organisms are: _____
~ 1.7 to 1.8 millions



Most diverse Animals → Insects

Most diverse Plants ⇒ Angiosperm.

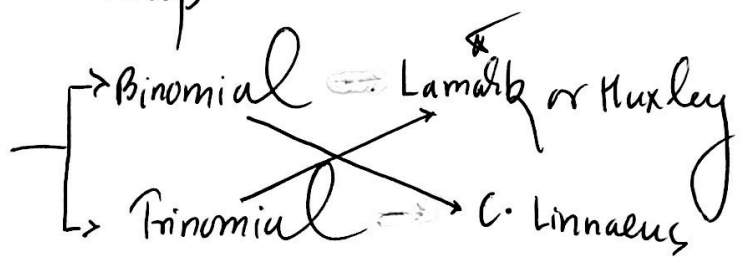
② Taxonomy → Lawful arrangement of organisms.

- Term → A.P. de Candolle
- Father → Carolus Linnaeus
- Founder → Aristotle
- Steps → 4 (Trick: CINC)
 - 1) Characterisation
 - 2) Identification
 - 3) Nomenclature
 - 4) Classification

* Taxa (sing Taxon) → category / Rank / Unit of classification / Group.

③ Nomenclature

• Systems of Nomenclature

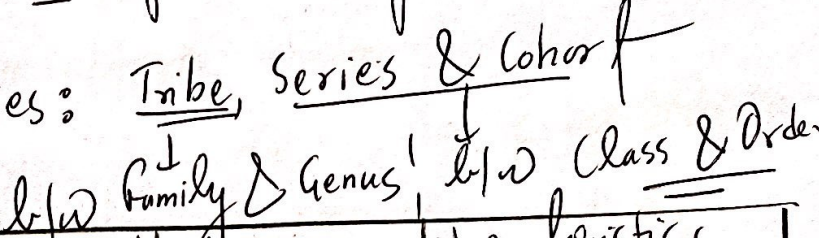


• Tautonyms & Autonyms

• Rules for Nomenclature

Taxonomic Categories

- All taxonomic categories together k/a Taxonomic Hierarchy
- First C. Linn. gave 5 categories → C, O, G, S, P
- Later 3 more added
- So, now broad taxonomic categories → 7
- * Intermediate categories → 21 for more refined & detailed analysis of characters.
- imp. intermediate categories: Tribe, Series & Cohort



* Trick	Taxonomic cat.	Suffix	Characteristics
<u>Keep</u>	Kingdom	x	* <u>up the hierarchy</u> (Species to Kingdom) • no. of <u>①</u> i) common characteristics → ↓ ii) general characteristics → ↑ iii) no. of species → ↑
<u>Put</u>	Phylum / Division	x	
<u>Clean</u>	Class	x	
<u>Otherwise</u>	Order	-ales, -ae	
	Family	-idae, -aceae	
<u>Family</u>	Sub-family	-inae	
<u>Gen</u>	Tribe	-ini	
<u>Stick</u>	Genus	x	
	Species	x	

1) Species (Adjective) : Lowest | Basic unit of classification

- A group of organisms having same evolutionary basis
- Identified on basis of distinct Morphological features.

* Term - Job Ray

* It represent Genetically closed system because genes of one species can't exchange with another species.

* Most accepted species concept is _____

"Biological concept of species" → Given by Ernst Mayer
Darwin of 20th Century

Based on "Reproductive Isolation"

• Drawbacks of Biological concept of species: _____

① Applicable only to sexually reproducing Plant & Animal species.

② Not Applicable to Bacteria (beccz it reproduces by Binary fission) So, Bacteria is non-biological species

③ Some closely related species interbreed = (e.g Mule)

* Sibling / sister species

→ Morphologically same but genetically unrelated & reproductively isolated.

- eg i) Drosophila persimilis & Drosophila pseudoobscura
- ii) Anopheles atroparvus & Anopheles maulipennis

② Genus → noun
→ Aggregate / group of closely related species

③ Family
→ Characterised on basis of both ① vegetative & ② reproductive features

Examples

① Solanaceae → Solanum tuberosum, S. melanoquina, S. nigrum
→ Lefunia
→ Datura

② Felidae → Felis → cat (Felis catas)
→ Panthera (P. leo, P. tigris, P. pardus)

③ Canidae → Dogs, wolf, fox → Vulpes vulpes
→ Canis lupus familiaris

④ Order → e.g. Sweet potato (Ipomea batata)

Examples

① Polymoniales → Convolvulaceae (bindweed or Morning glory family)
→ Solanaceae

* Based on floral characters

② Carnivora → Felidae
→ Canidae

⑤ Class

• Mammalia → Primate → (Monkey, Gorilla, Gibbon, Human)
→ Carnivora → (Tiger, Cat, Dog)

⑥ Division → for plants & Phylum → for animals

⑦ Kingdom

TAXONOMICAL AIDS

→ procedures & techniques to store & preserve the information as well as specimen.

→ Types:

① Herbarium

② Botanical Garden

③ Museum

④ Zoological Park

⑤ Key

* Indian Botanical Garden now k/a "Acharya J. C. Bose" BG & known for ① Giant Lily ② Great Banyan Tree

* ZP → Kolkata Zoo (Largest in World → SA) National Zoo → Delhi

* National Museum of Natural History, Delhi

Other means of recording descriptions

i) Flora → contains actual account of habitat & Distribution of plants of a given area.

OR
It provides the Index to the plant species found in a particular area.

ii) Manuals → provide information for identification of names of species found in an area.

iii) Catalogue iv) Monograph → contains information about any one taxon.

Some important Terms

1) Systematics (Latin word) → Term by C.L

→ Taxonomy + Phylogeny

→ Species (static)

2) Neosystematics / Biosystematics → Term by J. Huxley

→ Taxonomy + Phylogeny + Genetics

→ Species is dynamic

3) Cladistics → arrangement of organisms in historical order in which they were evolved.
→ phylogenetic classification

4) Phenetics → numerical taxonomy