

sorting every organism into a hierarchy, and naming each one exactly once



Systematics and Classification

- **systematics** : the kinds and diversity of organisms, their comparative and evolutionary relationships
- **taxonomy** : classification following set rules, from Greek taxis (arrangement) and nomos (law)
- the term was introduced by A. P. de Candolle
- **classification** : arrangement of organisms into distinct categories under a scheme, based on similarities and dissimilarities
- a category in this scheme is called a **taxon** : one rank in the overall taxonomic arrangement

Three Approaches to Classification *

Artificial

a few easily observed, non-evolutionary features like habit or colour, ignoring true affinity. e.g. Linnaeus

Natural

based on objectively significant features rather than convenience. e.g. Bentham and Hooker's system

Phylogenetic

based on common evolutionary descent. e.g. Engler and Prantl's classification

Three Approaches, Visualised *

- each approach sits on a different kind of evidence
- eye-level features, objectively weighed features, or shared ancestry

Classification approach



three ways to group organisms, distinguished by what evidence each one leans on

Chemotaxonomy and Numerical Taxonomy

- **chemotaxonomy** : classifies organisms by similarities and differences in their chemical compounds
- e.g. Archaea walls lack peptidoglycan, Eubacteria has it; fungal walls chitinous, plant walls cellulosic
- **numerical taxonomy** : quantifies characters, runs an algorithm like cluster analysis, instead of subjective judgement
- numerical taxonomy was first proposed by R. Sokal and P. Sneath in 1963

