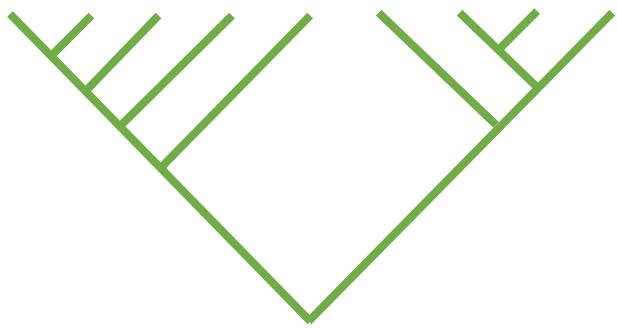


Biodiversity, evolution & taxonomy



Teaching Biodiversity for
FET Life Sciences

Ruan van Mazijk

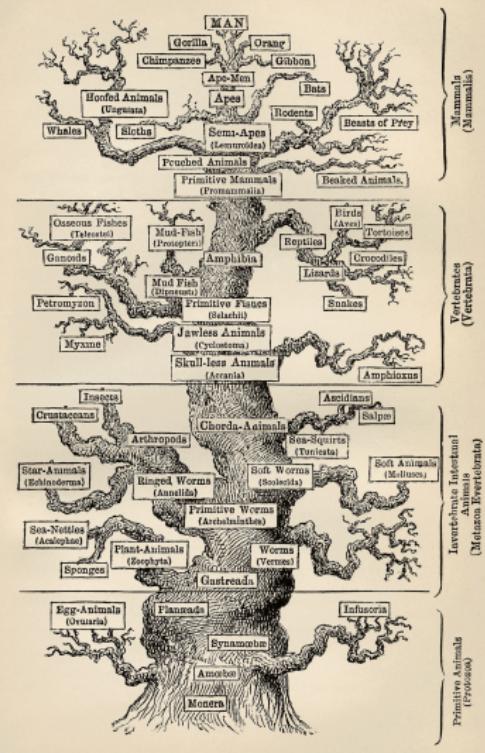


Chironia sp., Bobejaanskloof, 2018-05-24, CC BY 4.0 Ruan van Mazijk

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PEDIGREE OF MAN.



Ernst Haeckel's Tree of Life

The Tree of Life

- Discovering all its branches
- Understanding how those branches link together

Why study life's diversity?

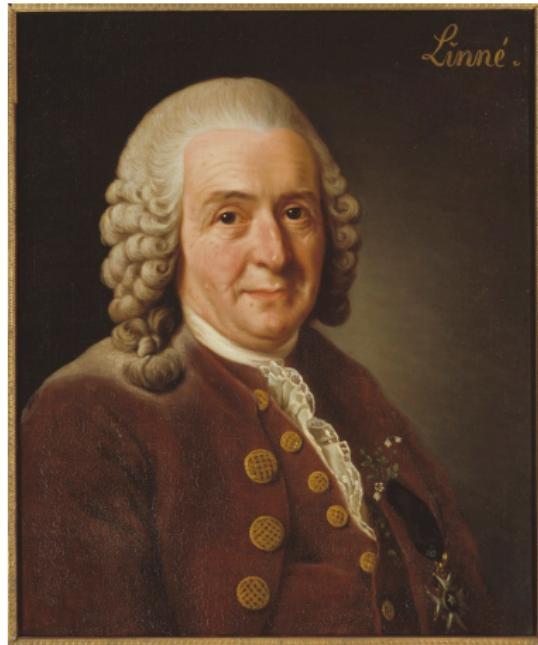
- For its own sake
- For the benefit of society
- For medicines, materials & food

Taxonomy

*The science of **classifying** & **naming** organisms*

- Foundation of all other life sciences
- Can't do much without knowing what something is...

Old-timey taxonomy: Linnaeus



Carl von Linné

Old-timey taxonomy: Linnaeus cont.

- Pre-evolutionary
- Classification based on sexual parts for plants (✓)
- A lot of Linnaeus' *Systema Naturae* & *Systema Plantarum* didn't hold up to modern scientific evidence...

But, he gave us 2x amazing (& simple!) things:

- Hierarchical classification
- Binomial nomenclature

Naming things: Nomenclature

- A unique name for every species
- Common-names led to confusion...



One of many plant species Linnaeus re-named

*Plantago foliis ovato-lanceolatus pubescentibus, spica
cylindrica, scapo tereti*

(= “plantain with pubescent ovate-lanceolate leaves, a
cylindrical spike and a terete scape”)

*Plantago foliis ovato-lanceolatus pubescentibus, spica
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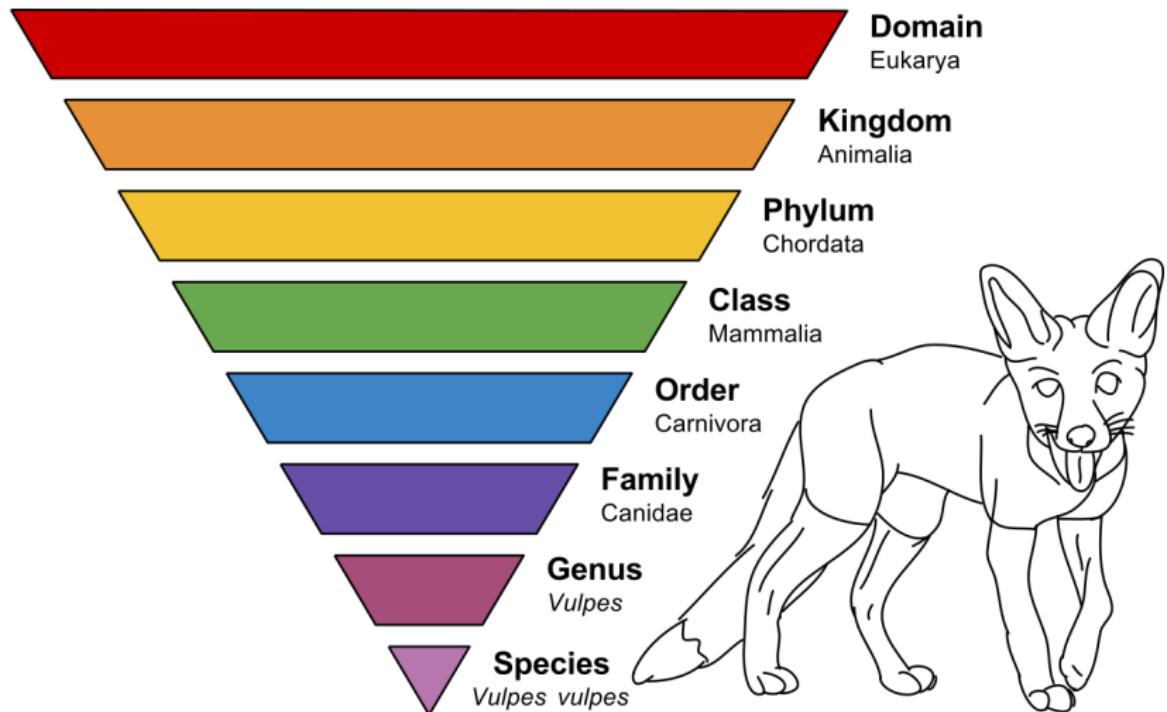


Plantago media



A mallard

Classifying things: Hierarchies

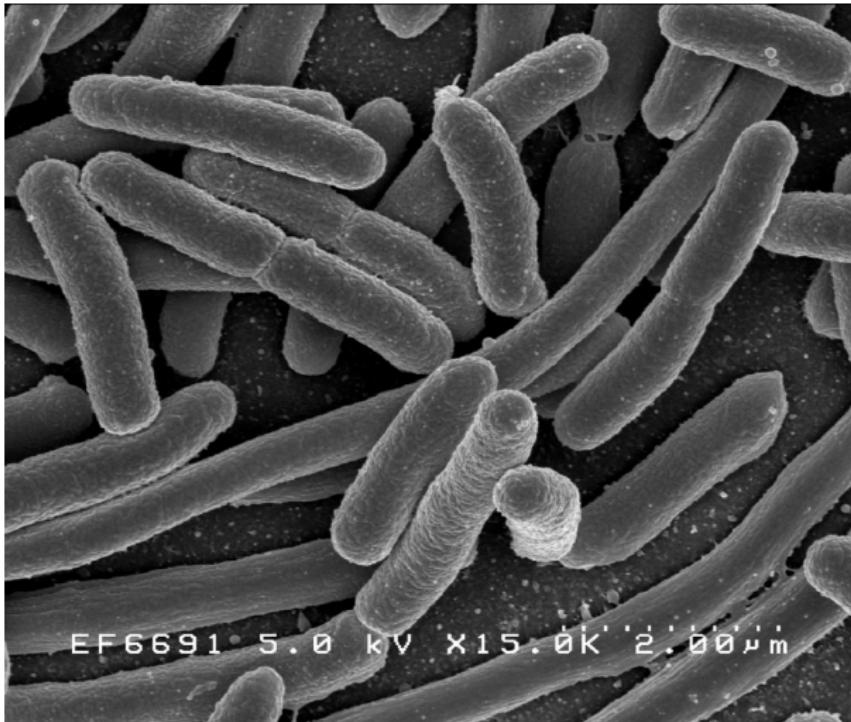


Red fox (*Vulpes vulpes*)

The domains

The 2x prokaryotic & 1x eukaryotic domains of the Tree of Life

Prokaryotes (simple life)



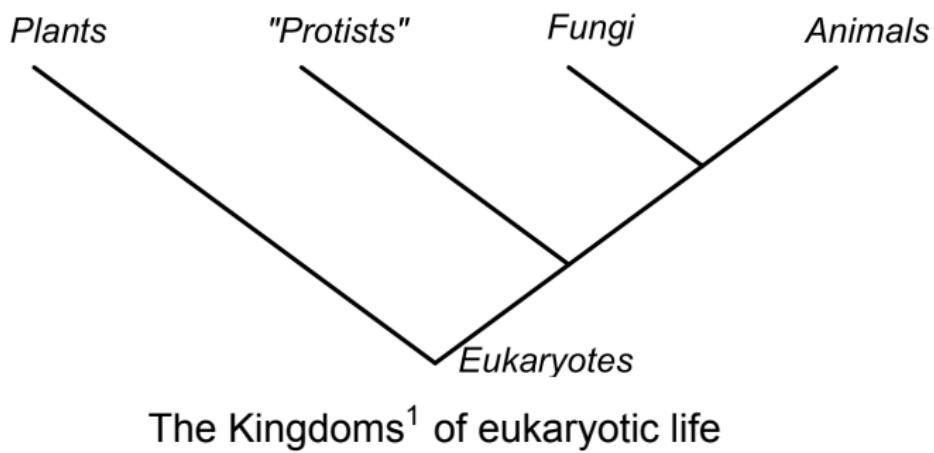
The bacteria species *E. coli*

Prokaryotes (simple life) cont.



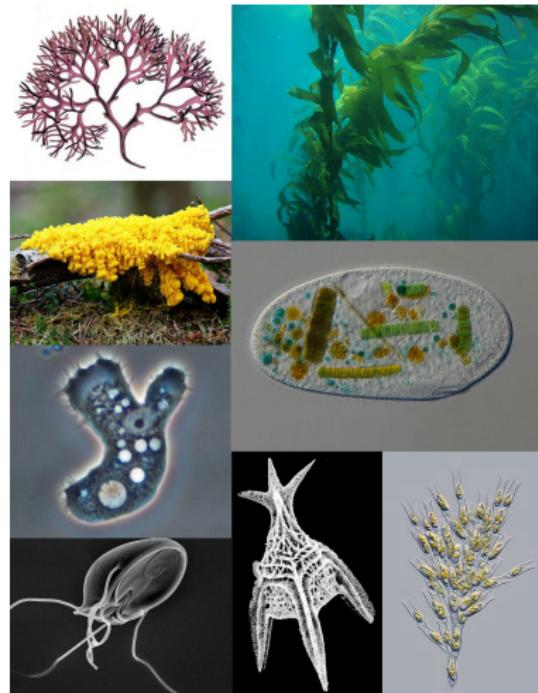
An extremophilic archaean

Eukaryotes (having a “true cell nucleus”)



¹Protists are mostly algal micro-organisms that are neither plants, fungi nor animals

Kingdom Protista



Protists are the “dust-bin” kingdom

Kingdom Fungi



Half animal, half plant

Kingdom Animalia



Animals both big & small

Animal phyla

*A range of **body-plans** among animals*

*More-or-less **increasing complexity***

- Porifera
- Cnidaria
- Platyhelminthes
- Annelida
- Mollusca
- Nematoda
- Arthropoda
- Echinodermata

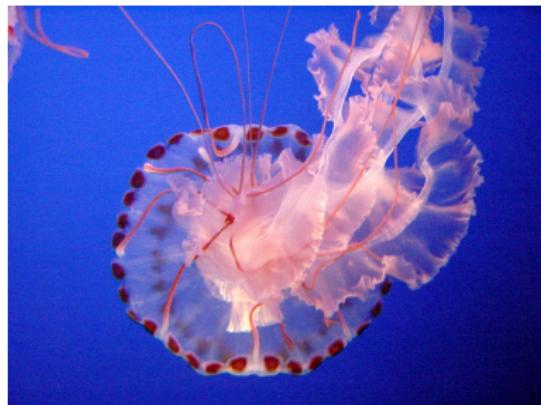
Phylum Porifera

- Sea-sponges
- Colonial vs true organism?



Phylum Cnidaria

Unique stinging cells “cnidocytes”!





A coral reef...



... made by coral polyps

Phylum Platyhelminthes

- Flatworms
- Some parasitic



A marine flatworm

Phylum Annelida

- Worms II: the Sequel
- Segmented-worms



An earthworm

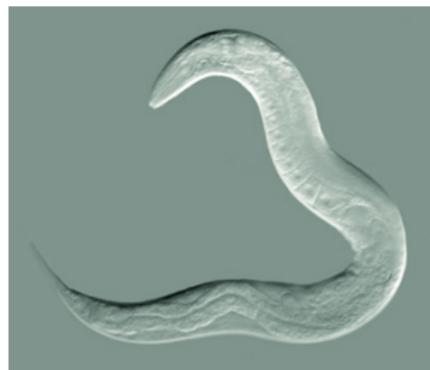
Phylum Mollusca

- All have a “mantel”, often in a shell
- Some of the most intelligent invertabrates!



Phylum Nematoda

- Worms III: the Revenge
- Roundwords
- Found *everywhere*
- Taxonomically challenging...



They all look kind of like this

Phylum Arthropoda

- “Jointed legs”
- Incredibly diverse



Phylum Echinodermata

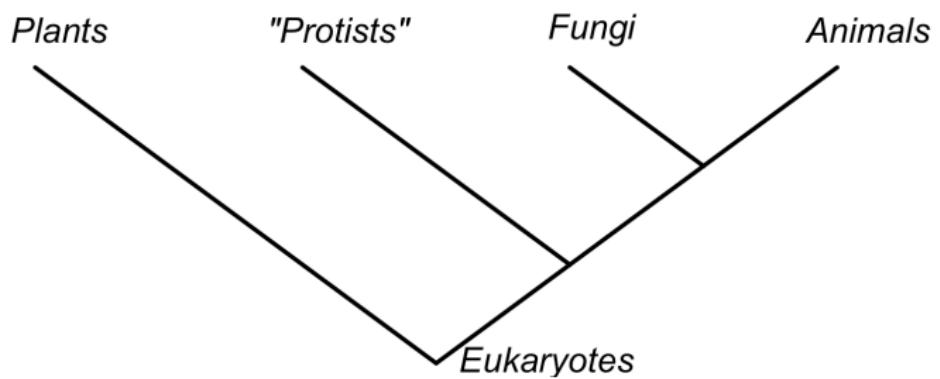
- Sea-stars & sea-cucumbers
- Five-way symmetry



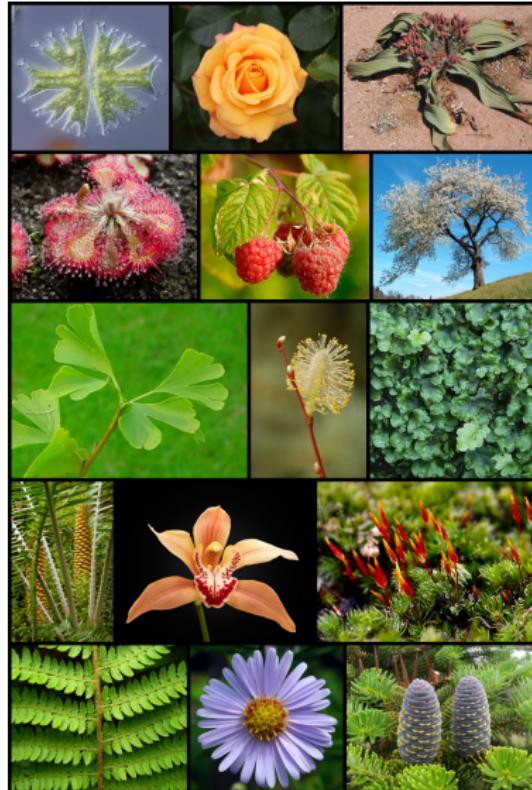
Phylum Chordata



Vertebrates!

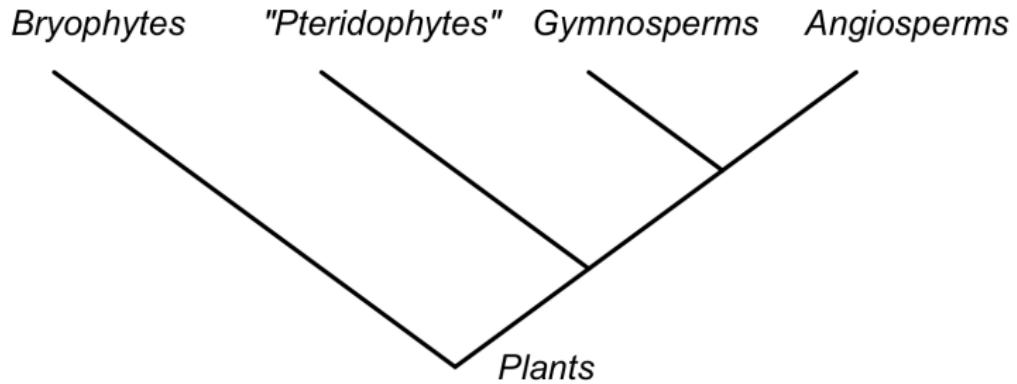


Kingdom Plantae



The green foundation of life on land

Major plant groups



Over to Dunja...

Thank you!