

Introduction to Botany. Lecture 3

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Outline

- 1 Questions and answers
 - Quiz
- 2 Plants in general
 - Green slug, spruce and full plant parasites
- 3 Plants in general
 - Levels of organization
 - Taxonomy
- 4 Ways of life
 - Energy and food



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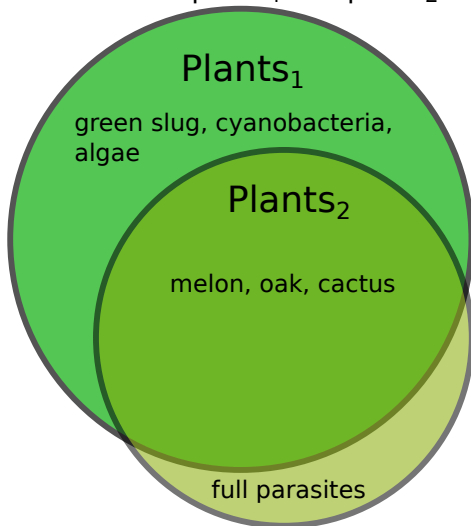
Questions and answers

Quiz



Quiz

What is the difference between plants₁ and plants₂?



Plants₁ and plants₂ are similar but **not** the same



Plants in general

Green slug, spruce and full plant parasites



Hydnora



Root parasite



Pilostyles



Tissue parasite



Dodder



Stem parasite



Plants in general

Levels of organization

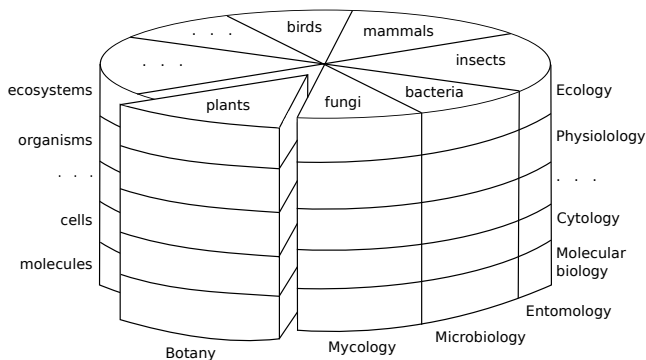


Levels of organization

- Ecosystems OR Taxa
- Populations
- Organisms
- Organs
- Tissues
- Cells
- Organelles
- Molecules



Place of botany



Layered cake of biology (Odum, 1971): botany is a
“slice science”



Plants in general

Taxonomy



Ranks

Most scientists accept seven main ranks:

- Kingdom
- Phylum
- Class
- Order
- Family
- Genus
- Species

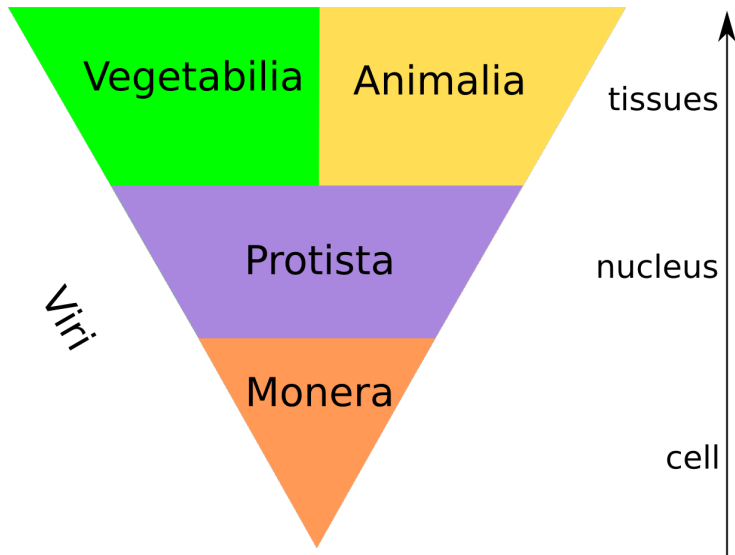


Names

- Names of species are binomials like *Solanum tuberosum* (potato)
- Names of other ranks are uninomials like **Vegetabilia** (plant kingdom)



Pyramid of life



Questions about pyramid

What is Monera? Prokaryotes: (1) Bacteria and (2) Archaea

What is Protista? Eukaryotes without tissues

Where are eukaryotes? Protista, Vegetabilia and Animalia

Where are fungi? They belong to different protists

Where are plants₂? Vegetabilia

Where are plants₁? Here it is not applicable

Why are two groups on one level? Vegetabilia and Animalia both have tissues but obtained them for the radically different purposes. Animals acquired *kinoblast* and *phagocytoblast* **to hunt and digest**, and plants have *epidermis* and *photosynthetic tissue* **to survive on land**.



Plants₁ and plants₂ (updated)

- Plants₁ are all photosynthetic organisms
- Plants₂ are **Vegetabilia**: multi-tissued, terrestrial, primarily photosynthetic eukaryotes



Ways of life

Energy and food



Ways of life

- How to obtain energy?
 - ① From sun light: **phototrophy**
 - ② From chemical reactions with inorganic matter (“rocks”): **lithotrophy**
 - ③ From breaking organic molecules into inorganic (typically, carbon dioxide and water): **organotrophy**
- How to obtain building blocks?
 - ① From assimilation of carbon dioxide: **autotrophy**
 - ② From other living beings: **heterotrophy**



Six life styles and taxonomy

	Phototrophs	Lithotrophs	Organo- trophs
Autotrophs	Plants ₁ : some Monera, some Protista, most of Vegetabilia	Some Monera	Some Monera
Heterotrophs	Some Monera	Some Monera	Majority of Animalia and many Protista and Monera



Plants₁, plants₂ and life styles

- Plants₁ are **photoautotrophs**
- Plants₂ are photoautotrophs too but there are exceptions: **fully parasitic plants**. Formally, many parasitic plants are plants₂ but not plants₁
- Carnivorous plants (like sundew or Venus flycatcher) are all photoautotrophs! They “eat” animals to obtain fertilizers: nitrogen and phosphorous.



Final question (1 point)



Final question (1 point)

Which of plants₂ are not plants₁?



Summary

- Botany is a “slice” science
- “Carnivorous” plants are not carnivores



For Further Reading



A. Shipunov.

Introduction to Botany [Electronic resource].

2016.

Mode of access:

http://ashipunov.info/shipunov/school/biol_154

