

# Introduction to Botany. Lecture 2

Alexey Shipunov

Minot State University

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# Outline

- 1 Questions and answers
  - Comments to introductory test

- 2 Plants: definition
  - Plants<sub>1</sub> and plants<sub>2</sub>

- 3 Plants in general
  - Levels of organization
  - Taxonomy



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# Questions and answers

## Comments to introductory test



# Question 1

1 Why deciduous plants take off their leaves?

- ① To prevent freezing
- ② **To prevent drying**
- ③ To get rid of poisonous chemicals



# Question 2

2 Where does human digestion process start?

- 1 **In the mouth**
- 2 In the intestines
- 3 In the stomach

*Amylase and lipase*



# Question 3

3 Which birds do NOT live in Minot on winter?

- 1 Crows
- 2 **Hummingbirds**
- 3 Sparrows





# Question 4

## 4 Home country of watermelon:

- 1 Central America
- 2 Canada
- 3 **South Africa**



# Question 5

## 5 Why do insectivorous plants eat insects?

- ① **To obtain the lacking mineral resources**
- ② To get an addition to their common “menu”
- ③ To get rid of herbivores



# Question 6

## 6 Which insects have no queen?

- 1 Bumblebees
- 2 Ants
- 3 **Cockroaches**



*Bumblebees*

# Question 7

7 Oak tree is pollinated by:

- 1 **Wind**
- 2 Bees
- 3 Flies



*Oak flowers*



# Question 8

8 Spider has:

- 1 6 legs
- 2 **8 legs**
- 3 4 legs



# Question 9

9 Apple flower has:

- 1 **5 petals**
- 2 4 petals
- 3 3 petals



# Question 10

10 Frightened man has:

- 1 **Bigger pupils**
- 2 Smaller pupils
- 3 Normal pupils



# Question 11

11 Polar bears are not eating penguins because:

- 1 Penguins run very fast
- 2 **They cannot meet**
- 3 Penguins are poisonous for bears



■ POLAR BEAR DISTRIBUTION (approx.)





# Question 12

12 How many toes are on each of cat's hind legs?

- 1 5
- 2 4
- 3 3



# Question 13

13 Pineapple is a:

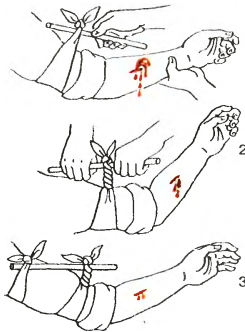
- 1 Tree
- 2 Shrub
- 3 **Herb**



# Question 14

14 If somebody has an artery cut on the arm or leg, it is recommended:

- 1 Put a tight bandage below the cut
- 2 **Put a tight bandage above the cut**
- 3 Do nothing



# Question 15

15 Which of the following is the most precise statement?

- ① We are breathing to support our life
- ② **We are breathing to obtain the energy from food**
- ③ We are breathing to have enough strength for food consuming



# Question 16

16 Which tree is better to plant in Minot house backyard:

- 1 Sycamore
- 2 **Ash**
- 3 Yew



# Question 17

17 Moles eat:

- ① **Worms**
- ② Roots
- ③ Frogs



# Question 18

18 Which fish gives birth to the fully developed offspring?

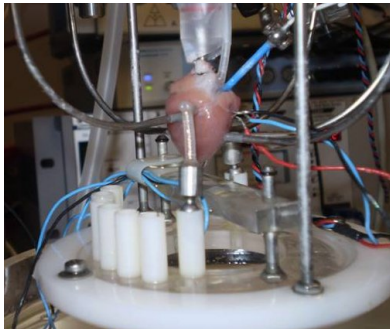
- 1 Sturgeon
- 2 **Shark**
- 3 Flounder



# Question 19

19 Which human organ lives longer?

- 1 **Heart**
- 2 Lungs
- 3 Brains





# Question 20

20 Which plant normally has a longer root?

- 1 Spruce
- 2 **Chokecherry**
- 3 Blueberry



*Fallen spruce tree*



# Plants: definition

## Plants<sub>1</sub> and plants<sub>2</sub>



# Plants<sub>1</sub> and plants<sub>2</sub>

- Plants<sub>1</sub> are all green photosynthetic organisms
- Plants<sub>2</sub> are “typical plants” (better definition follows)



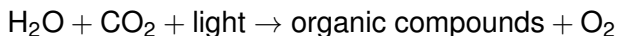
# The nature of two definitions

- Plants<sub>1</sub>—ecological definition (based on the role in nature)
- Plants<sub>2</sub>—taxonomic definition (based on the evolution)



# Plants<sub>1</sub> is about ecology

Plants<sub>1</sub> are *photosynthetic organisms*:



Some plants<sub>1</sub> could taxonomically be bacteria or even animals!



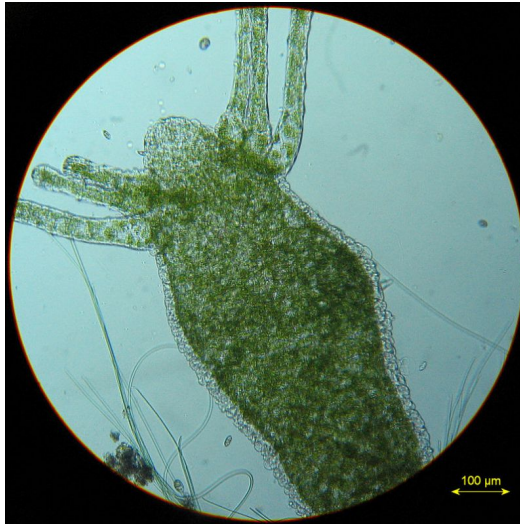
# Green slugs



Green slugs obtain chloroplasts from algae, but keep them all their life, feed from them and even use chloroplast genes.



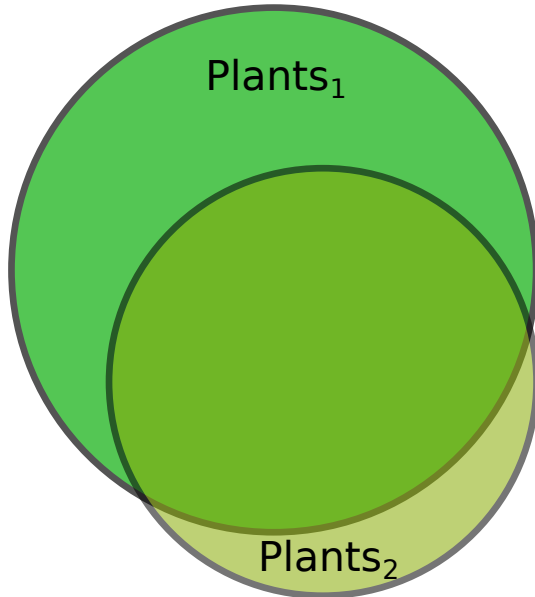
# Green *Hydra*



No mouth!



# Plants<sub>1</sub> and plants<sub>2</sub> are similar but **not** the same





# Plants in general

## Levels of organization

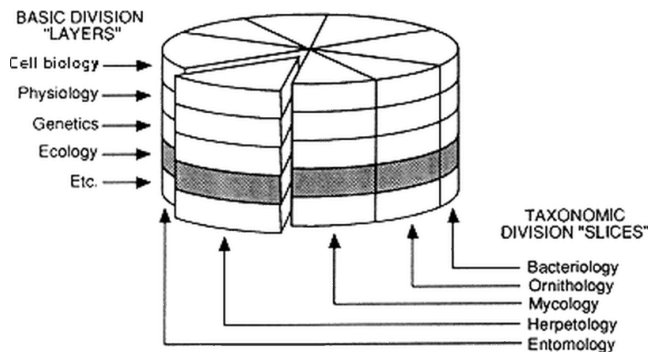


# Levels of organization

- 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

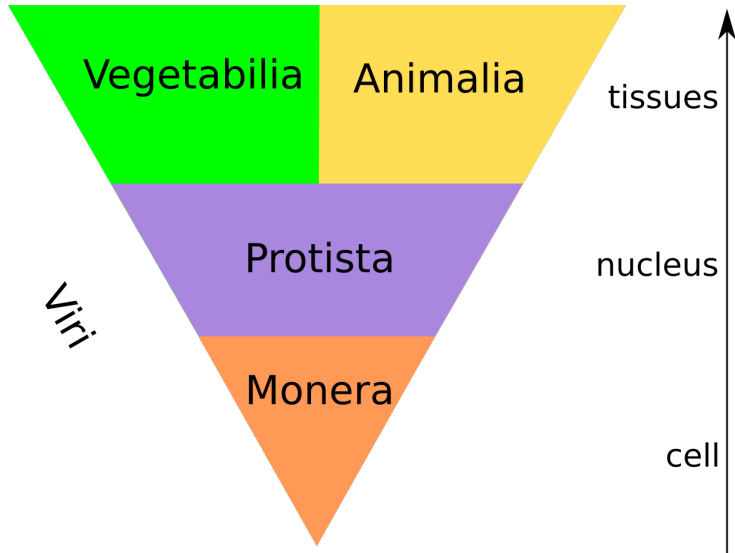


# Names

- 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 plants<sub>2</sub>? Vegetabilia

Where are plants<sub>1</sub>? It is not applicable here

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**.





# Plants<sub>1</sub> and plants<sub>2</sub> (updated)

- Plants<sub>1</sub> are all photosynthetic organisms
- Plants<sub>2</sub> are **Vegetabilia**: multi-tissued, terrestrial, primarily photosynthetic eukaryotes



# Final question (2 points)



# Final question (2 points)

What is the difference between plants<sub>1</sub> and plants<sub>2</sub>?



# Summary

- “Plants” have **two definitions**
- **Botany** is a “slice science” which covers multiple **levels of organization**



# For Further Reading



A. Shipunov.

*Introduction to Botany* [Electronic resource].

2015.

Mode of access:

[http://ashipunov.info/shipunov/school/biol\\_154](http://ashipunov.info/shipunov/school/biol_154)

