

A watercolor illustration of several purple flowers with green leaves, serving as a background for the title text. The flowers are rendered in soft, painterly strokes, with some in full bloom and others as buds. The leaves are a mix of light and dark green, with visible veins.

Introduction to Botany



PhD Vladimir Randelović, full professor

**Faculty of Science and Mathematics
Department of Biology and Ecology**

st. Višegradska 33

Tel. 533 015 lok. 55

E-mail: vladar@pmf.ni.ac.rs

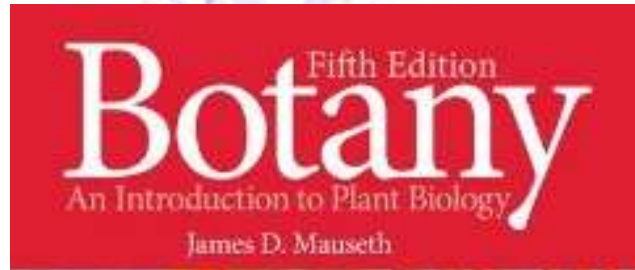
Web: www.vladimirrandjelovic.com

Assistant:

PhD Jelena Matejić

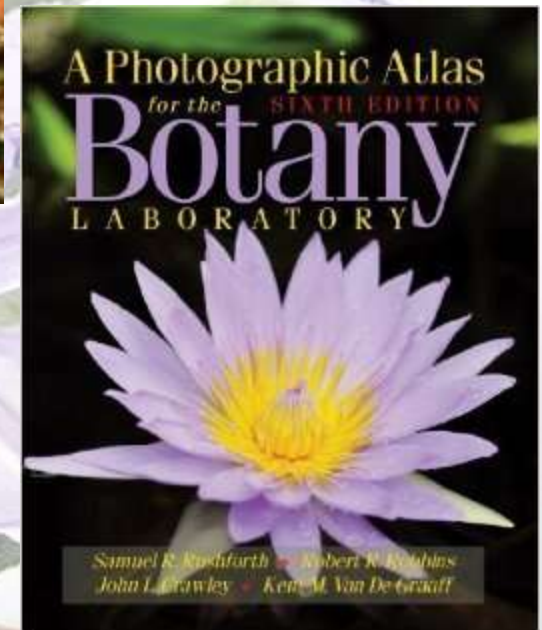
Recommended literature is:

Peter H. Raven, Ray F. Evert, Susan E. Eichhorn (2005): Biology of Plants. W.H. Freeman.



James D. Mauseth (2012): Botany: An Introduction to Plant Biology, 5th ed., Jones and Bartlett Learning, LLC.

Samuel R. Rushforth, Robert R. Robbins, John L. Crawley, Kent M. Van De Graaf (2012): A Photographic Atlas for the Botany Laboratory, 6th ed.

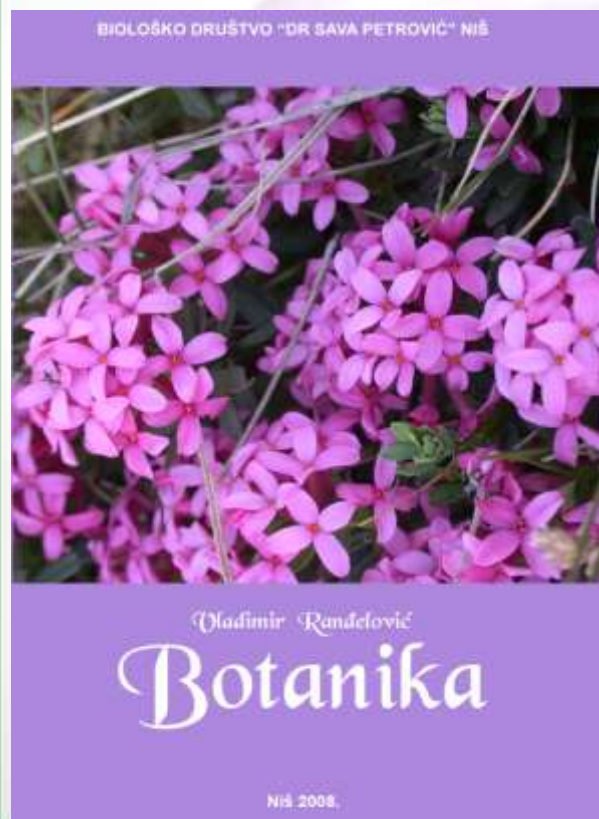


You can also use the book in serbian:

Vladimir Randelović, Marina Jušković, Bojan Zlatković (2006): Praktikum iz botanike, 1.

Vladimir Randelović (2008): Botanika. Biološko društvo "Dr Sava Petrović.

Radiša Jančić (2002): Botanika farmaceutika. Službeni list SRJ. Beograd.



**Vladimir Randelović,
Jelena Matejić, Zorica
Mitić: Praktikum iz
sistematike i ekologije
lekovitih biljaka. Punta,
Niš.**

**Miloje Sarić (ed.) (1989):
Lekovite biljke Srbije. SANU, Beograd.**

Flora Srbije, 1-10. SANU, Beograd.

Lectures



optional/recommended

Practice

obligatory

Field work

obligatory/Vlasina

Herbarium

herbarium with 100 medicinal plants

Exam

practical/oral

What is needed for the exercise of botany?

- Botanical practicum
- wooden pencil
- colored wooden pencils
- pincette
- dropper
- hand magnifier
- box gillette
- laboratory needle



Why is it necessary to know the plants?



Is pharmacists need BOTANY?



The importance of plants

General

production of oxygen
primary producers
fossil fuels
remediation of air and water



Practical

use in feeding
medicinal plants
honey plants
spices plants
decorative plants
plants as bioindicators
remediation of air
water purification
building materials
textile fibers
plant pigments
use in cosmetics

MEDICINAL PLANTS (HERBS)



Digitalis feruginea

- use in the distant past (Chinese, Indians, Egyptians, Greeks, Romans)
- Hippocrates (460-377)
- Dioscorides (I century AD) *De materia medica*
- Pliny the Elder (23-79) and Galen (131-201)
- middle age (monasteries)
- 15-18th century (L. Fuchs, A. Matthioli and others)
- Carl von Linne, Lavoisier and others
- Josif Pančić, Sava Petrović

- tradicional medicine (ethnomedicine)
- use in official medicine (phytotherapy)
- making of medicinal preparations (parapharmaceutics)
- making of drugs (pharmaceutics)



Teucrium montanum

BOTANY– Plant science



Achillea clavенаe

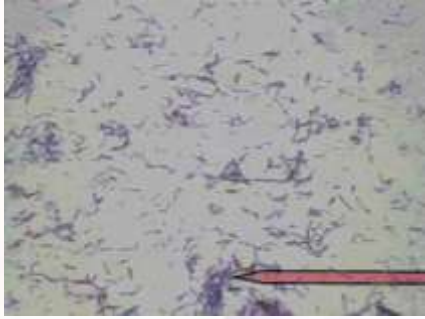
- people's experiences and knowledge about plants
- Antoni van Leeuwenhoek (microscope)
- Robert Hooke (cell)
- Carl von Linné (scientific names)
- Charles Darwin (evolution)
- Gregor Johann Mendel (genetics)

- **MORPHOLOGY and ANATOMY OF PLANTS** (cytology, histology, organography)
- **PHYSIOLOGY OF PLANTS**
- **SYSTEMATICS OF PLANT** (floristic, phylogeny, taxonomy)
- **PHYTOCHEMISTRY and PHYTOGENETICS**
- **MOLECULAR BIOLOGY**
- **GEOBOTANY** (phytoecology, phytogeography)
- **PALEOBOTANY and PALINOLOGY** and others



Satureja subspicata

POSITION OF PLANTS IN THE MODERN SYSTEM OF CLASSIFICATION OF LIVING ORGANISMS



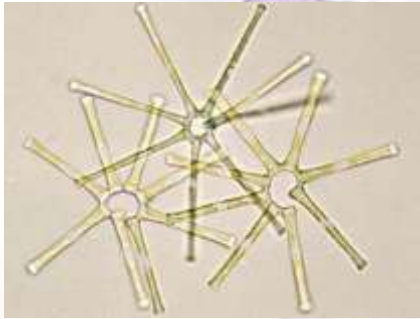
Monera



Protista



Animalia



Fungi

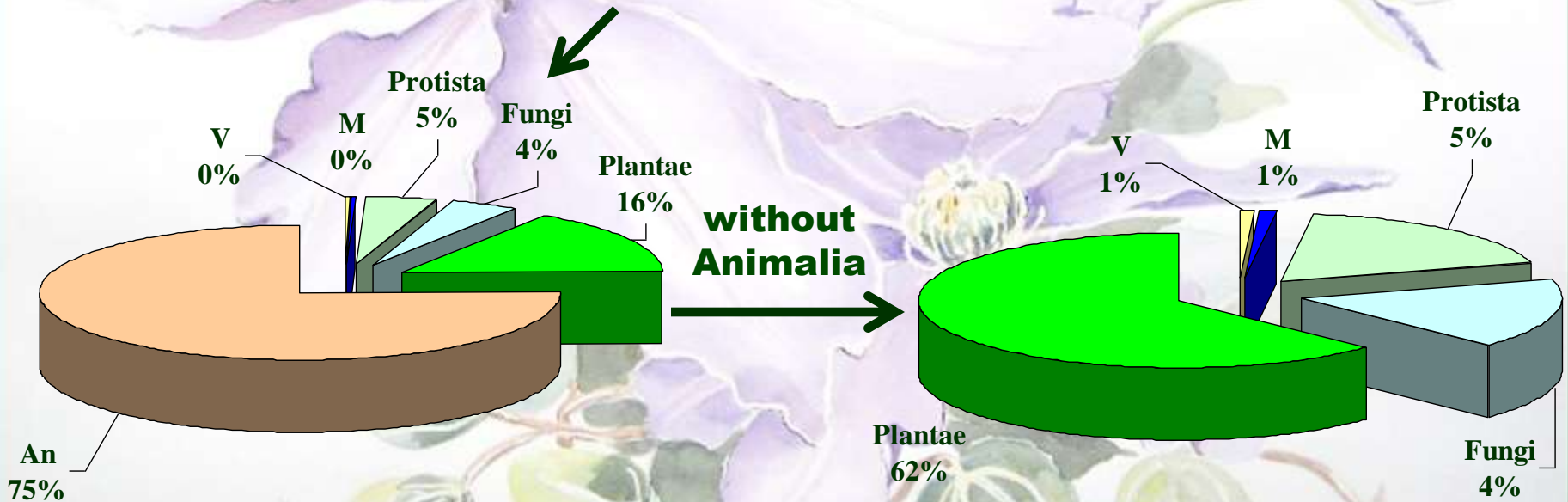


Pulmonaria officinalis

Plantae

NUMBER OF SPECIES ON EARTH

Kingdom	Known	Assumed upper limit	Assumed lower limit
<i>Virusi</i>	4000	1000000	50000
<i>Monera</i>	4000	3000000	50000
<i>Protista</i>	80000	1200000	210000
<i>Fungi</i>	72000	2700000	200000
<i>Plantae</i>	270000	500000	300000
<i>Animalia</i>	1300000	10320000	2725000
Ukupno	1730000	18720000	3535000



POSITION OF PLANTS IN THE MODERN SYSTEM OF CLASSIFICATION OF LIVING ORGANISMS

	Cell organization	Chromosomes Nucleus	Photosynthetic pigments, Plastids	Cell wall
<i>Monera</i>	procaryotic uni- or multicellular	DNA without histone, n. without envelope	without or with chlorpyll a p. absent	not cellulose
<i>Protista</i>	eucaryotic uni- or multicell. without tissue	DNA with histone, n. with envelope	without or with chlorpyll a, b, c, d and e, p. absent or present	absent or cellulose
<i>Fungi</i>	eucaryotic multicellular, without tissue	DNA with histone, n. with envelope	without ph. pigments p. absent	chitin
<i>Plantae</i>	eucaryotic multicellular with tissue	DNA with histone, n. with envelope	chlorophyll a and b all types of plastids	cellulose
<i>Animalia</i>	eucaryotic multicellular	DNA with histone, n. with envelope	without ph. pigments, p. absent	absent

HOW DISTINGUISH PLANT AMONG THE MANY ORGANISMS?

Plant cells contain the pigment chlorophyll and carotenoids and perform photosynthesis.

Plant cell is enveloped with the cell wall.

Plants take minerals from the environment, mainly by the roots from the soil.

Plants absorb light energy and transform it into a potential.

Plants are constantly growing, thanks to the presence of tissue whose cells are constantly divided (meristems).

During the life of the plants two phases of development alternate - diploid (sporophyte) and haploid (gametophyte).

IDENTIFY PLANTS



Sea anemone
ANIMALIA



Sea anemone
ANIMALIA



Coral
ANIMALIA



Sea anemone
ANIMALIA



Cryptocorine
PLANTAE



Sea anemone
ANIMALIA



Drosera
PLANTAE



Ophrys
PLANTAE

HOW MUCH SUCCESS DID YOU HAVE?

MORPHOLOGICAL ORGANIZATION OF ALGAE

Unicellular organization

Monadoide

Rhizopods

Coccoide



Phacus



Amoeba



Closterium



Hematococcus

Colonial organization

Open

Coenobia

Palmelloid

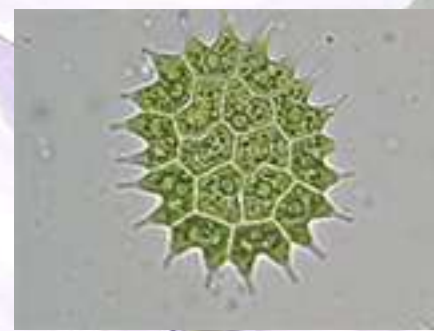
Motile



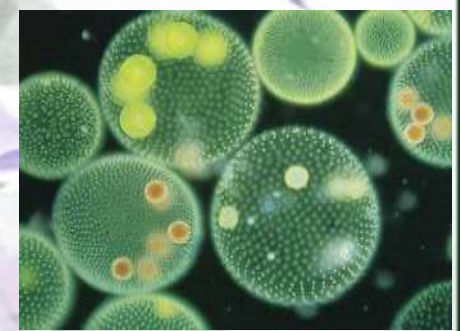
Dinobryon



Scenedesmus



Pediastrum



Volvox

Monomorphic (all cells were same)

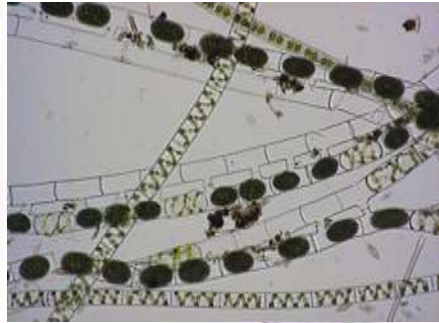
Polymorphic (cells are different)

MORPHOLOGICAL ORGANIZATION OF ALGAE

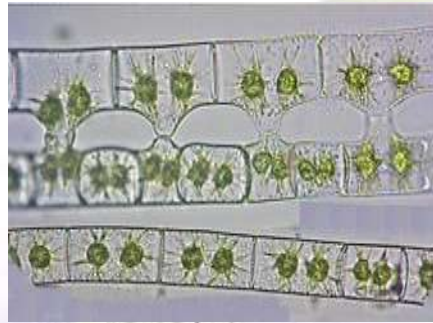
Multicellular organization - thallus

Simple filamentous

Branched filamentous



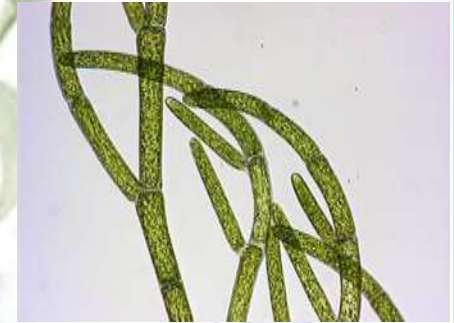
Spirogyra



Zygnema



Draparnaldia



Cladophora

Parenchymatous

Siphonal

Cormoid



Fucus



Laminaria



Caulerpa



Nitella

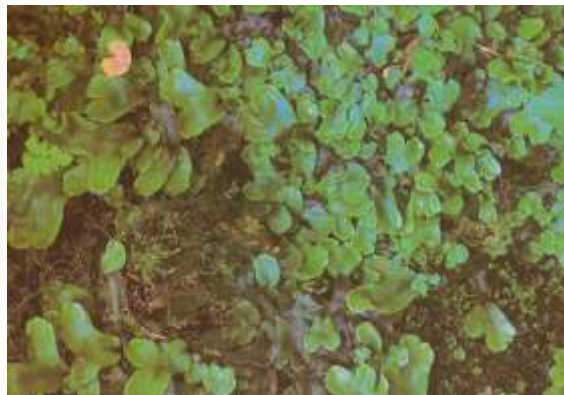
Pseudoparenchymatous – plectenchyma

a compact mass of cells, made up of interwoven filaments, that superficially resembles plant tissue.

MORPHOLOGICAL ORGANIZATION OF PLANTS

Multicellular organization - cormus

Thalloid cormus



Conocephalum

Moss



Polytrichum

Sphagnoid moss



Sphagnum

Vascular plants

Ferns



Gymnocarpium

Gymnosperms



Abies



Linum tauricum

Flowering plants