Botany

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Bibliography

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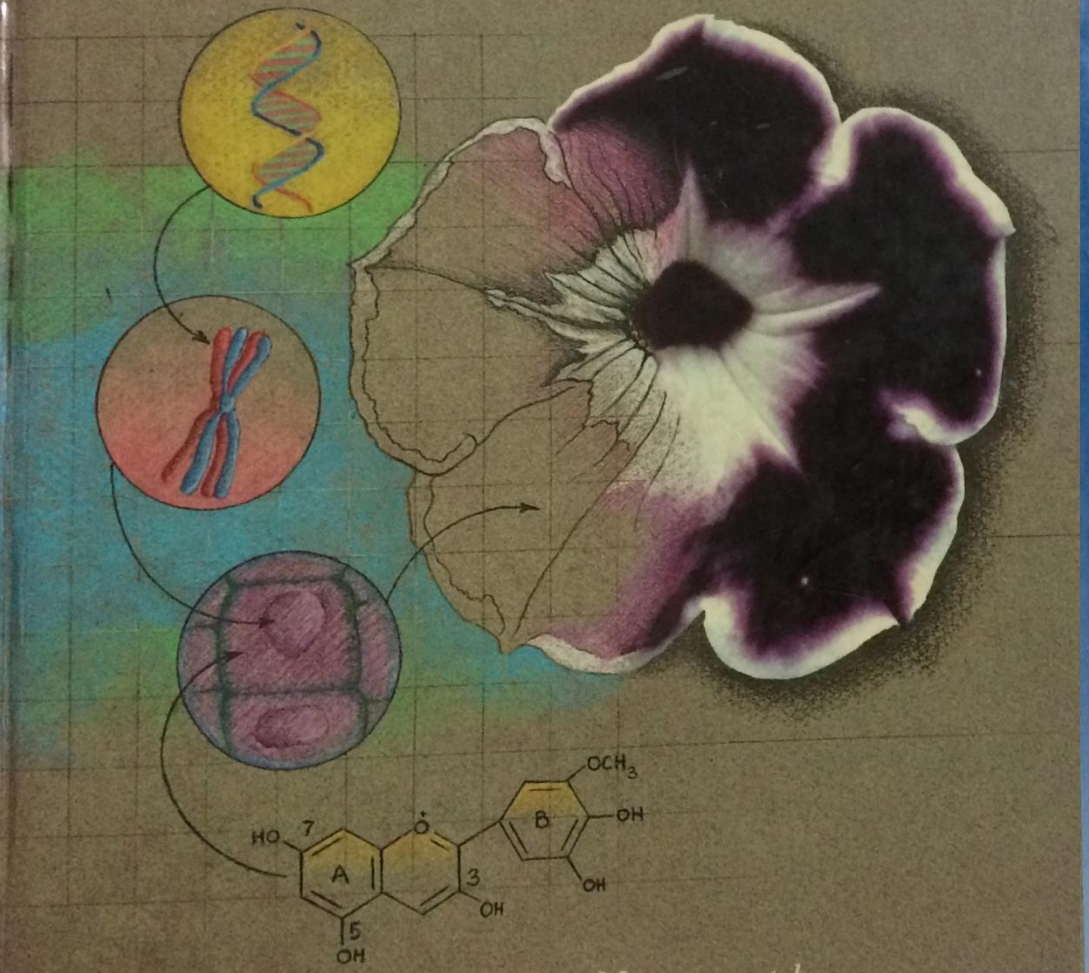
BOTANY

An Introduction to Plant Biology



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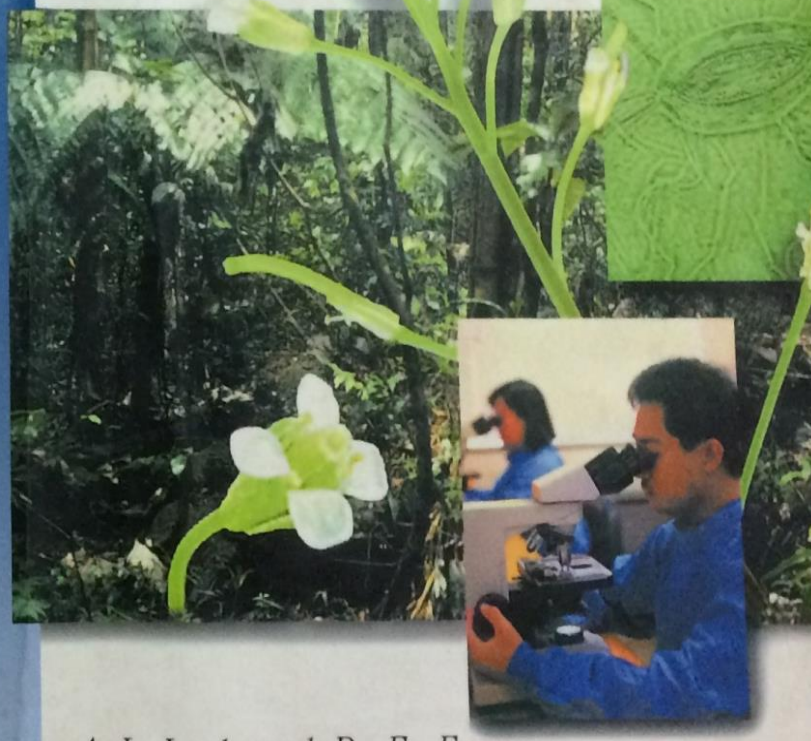

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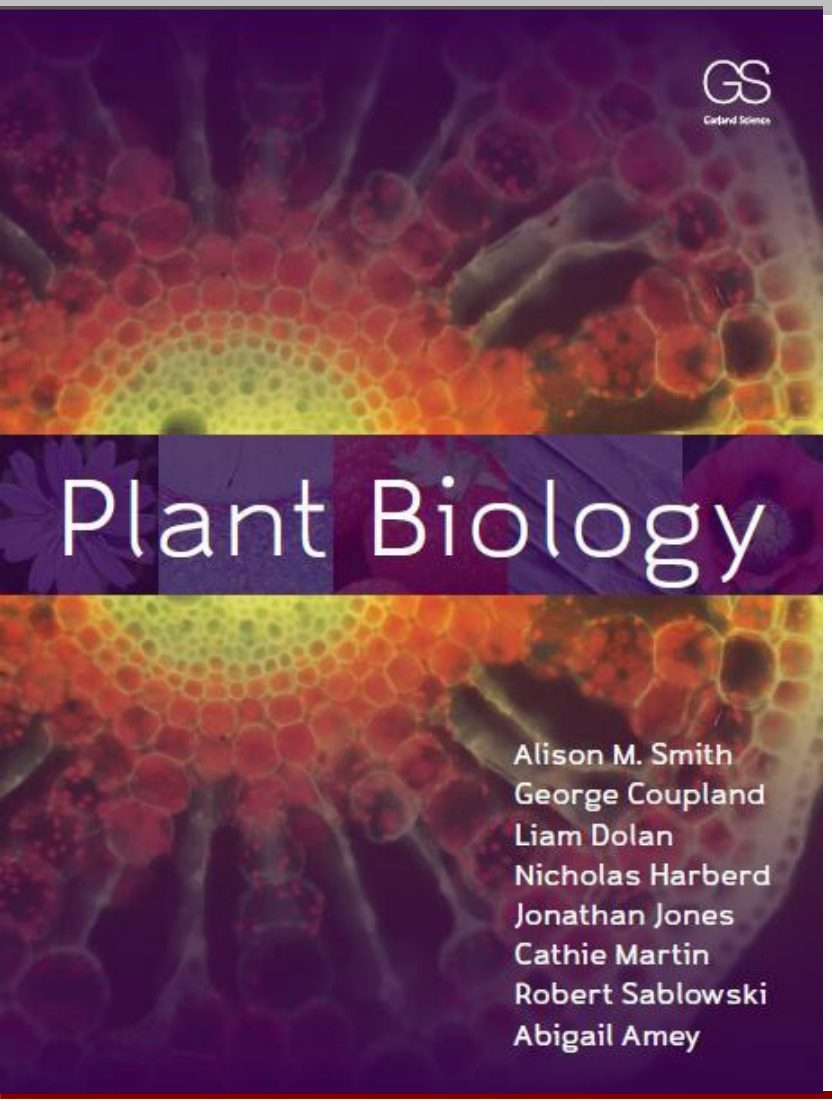
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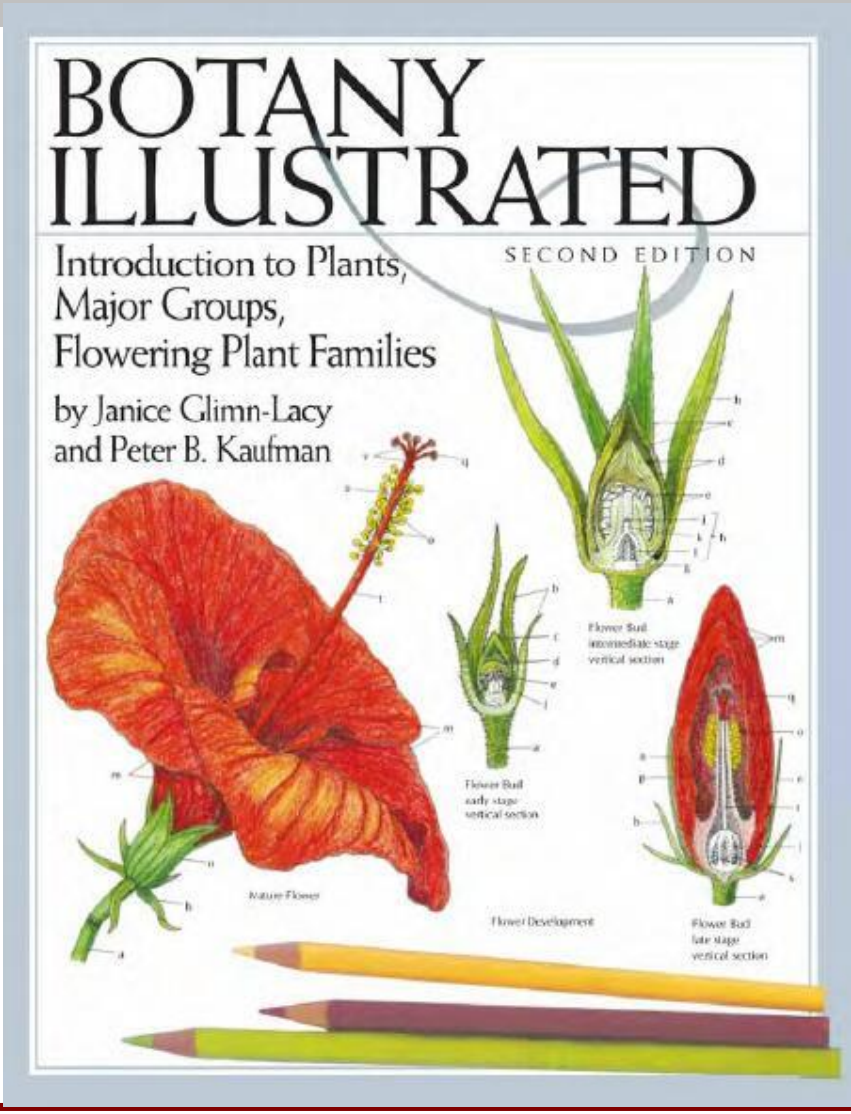

BOTANY ILLUSTRATED
SECOND EDITION
Introduction to Plants, Major Groups, Flowering Plant Families
by Janice Glimn-Lacy and Peter B. Kaufman

What is a plant ?

You already have some notion of what a plant is—an immobile, green organism that we eat, mow, and use for decoration and shade—but it's difficult to come up with a simple definition for the word *plant*. Not all plants are green, and some plants consume animals. Indeed, many plants do not look or seem like plants at all, but the most familiar plants share a few common characteristics.

Plants share many characteristics with other organisms

- Take in and use energy.
- Consist of a single cell or many cells.
- Reproduce.
- Respond to the environment in which they live.
- Share parts of a common ancestry and have coevolved with other organisms.

The term "botany" comes from the Ancient Greek word βοτάνη (botanē) meaning "pasture", "grass", or "fodder"; βοτάνη is in turn derived from βόσκειν (boskein), "to feed" or "to graze".

Plantae

Animalia

(Carolus Linnaeus,1707-1778)

2 Kingdom system

Protista — 3 Kingdom system (Haeckel, 1866)

Fungi — 4 Kingdom system (Whittake, 1959)

Monera — 5 Kingdom system (Whittake, 1969)

Vira — 6 Kingdom system

(Chen shixiang, in the 1970s)

The Classification of Living Organisms

About 10 million different kinds of organisms living on earth, of which only about 1.4 million have been named and catalogued.

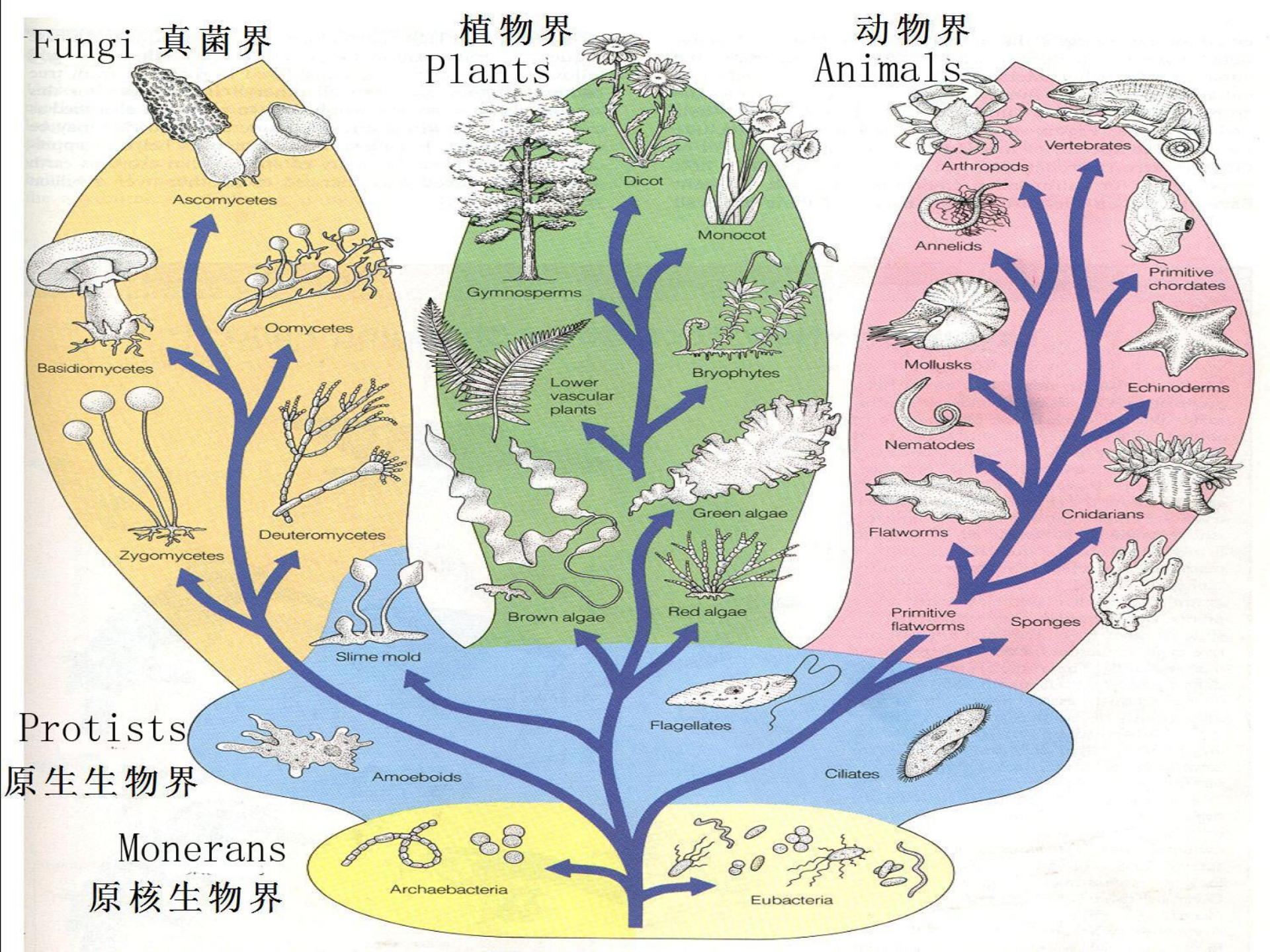
- The Two Kingdoms of Life [Carolus Linnaeus (1707-1778)]
  - ? Kingdom Plantae
  - ? Kingdom Animalia

The classification was mainly based on Modes of Nutrition and Mobility (ability of movement)

The Five Kingdoms of Life

R.H. Whittaker (1969)

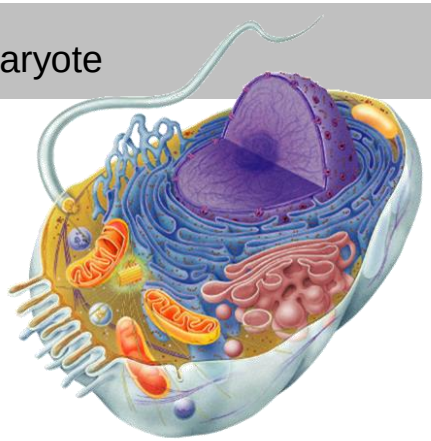
- 原核生物界/Kingdom Monera: Cells of organisms lack a nuclear envelope and other membrane-bound organelles.
- 原生生物界/Kingdom Protista: Eukaryotic unicellular or multicellular organisms.
- 真菌界/Kingdom Fungi
- 植物界/Kingdom Plantae
- 动物界/Kingdom Animalia
  (cell structure, modes of nutrition, morphological characteristics)

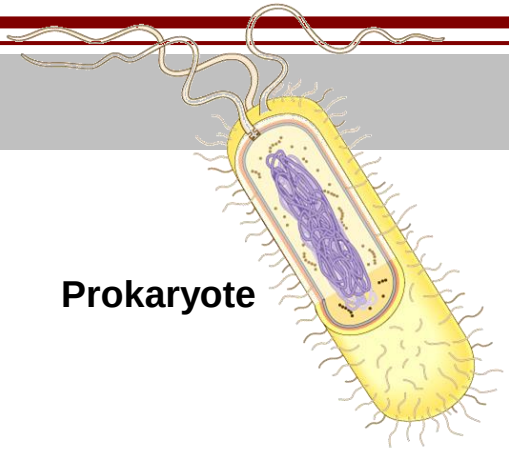

Fungi 真菌界
植物界
Plants
动物界
Animals
Ascomycetes
Basidiomycetes
Oomycetes
Zygomycetes
Deuteromycetes
Dicot
Monocot
Gymnosperms
Bryophytes
Lower vascular plants
Green algae
Brown algae
Red algae
Slime mold
Arthropods
Vertebrates
Annelids
Primitive chordates
Mollusks
Echinoderms
Nematodes
Cnidarians
Flatworms
Primitive flatworms
Sponges
Protists
原生生物界
Flagellates
Amoeboids
Ciliates
Monerans
原核生物界
Archaebacteria
Eubacteria

Background

Biologists have long organized living things into large groups called kingdoms.

Eukaryote

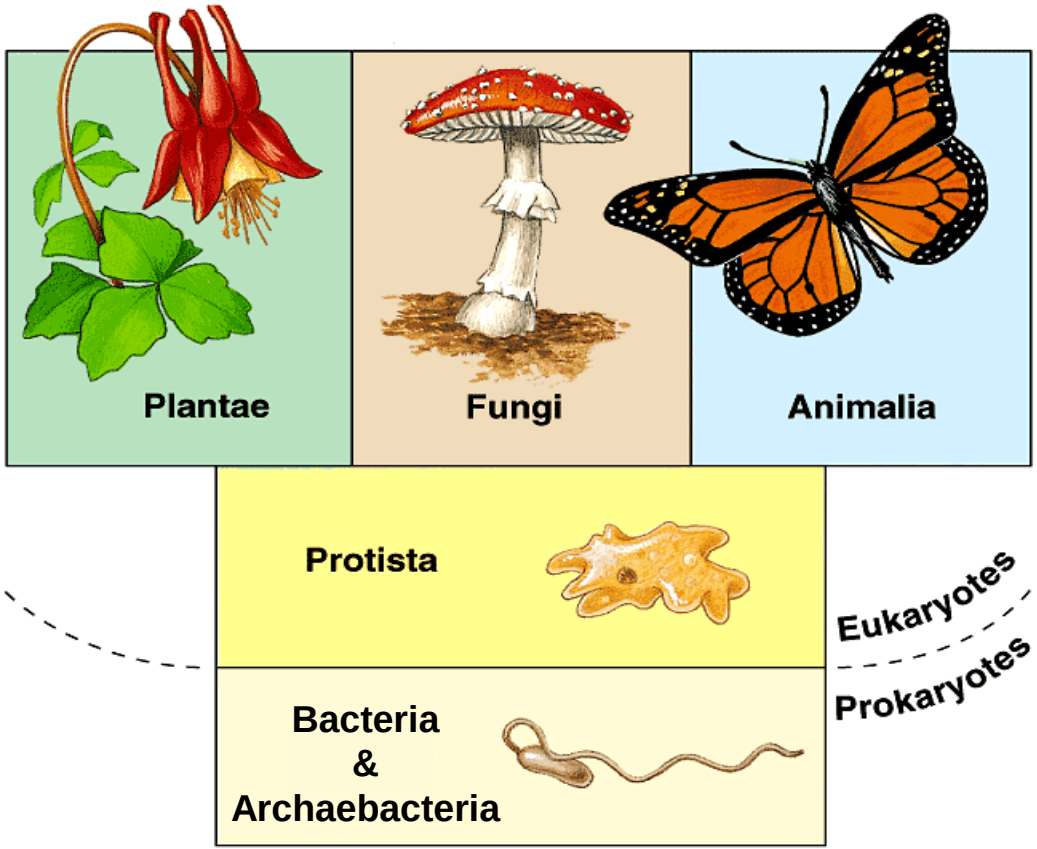




Prokaryote

Kingdom system

- Prokaryotes
  - No separate organelles in their cells
  - ➢Bacteria
    - ➢Archaebacteria
- Eukaryotes
  - Separate organelles in their cells
  - Protists
  - Plants
  - Fungi
  - Animals



Prokaryotes

Kingdom Bacteria

Kingdom Archaebacteria

Kingdom Protist

Eukaryotes

Kingdom Fungi

Kingdom Plant

Kingdom Animal

2. Plant diversity

(1)Types： Five hundred thousand（Animals: 1 millon）

The Plantae includes all land plants: mosses, Fungi, ferns, conifers, flowering plants

(2) Distribution： worldwide

(3) Size:

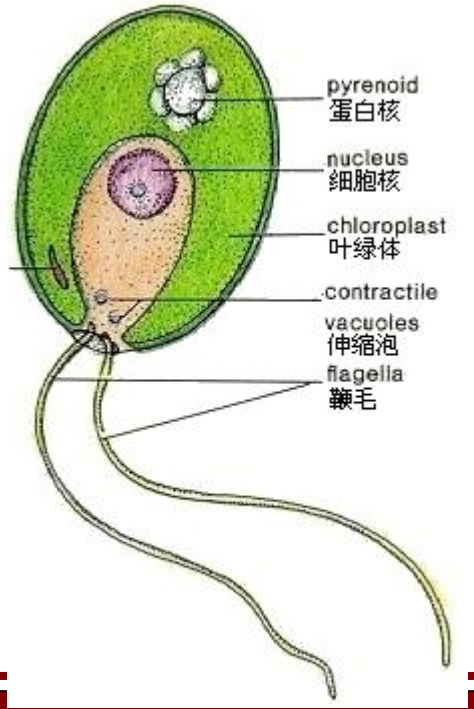
mycoplasma D : 0.1um;

micrococcus（微球菌） D : 0.1um

big trees

(4) Structure

- **single cell type： chlamydomonas**
- **group：**
- **many cell type： rose, rape**

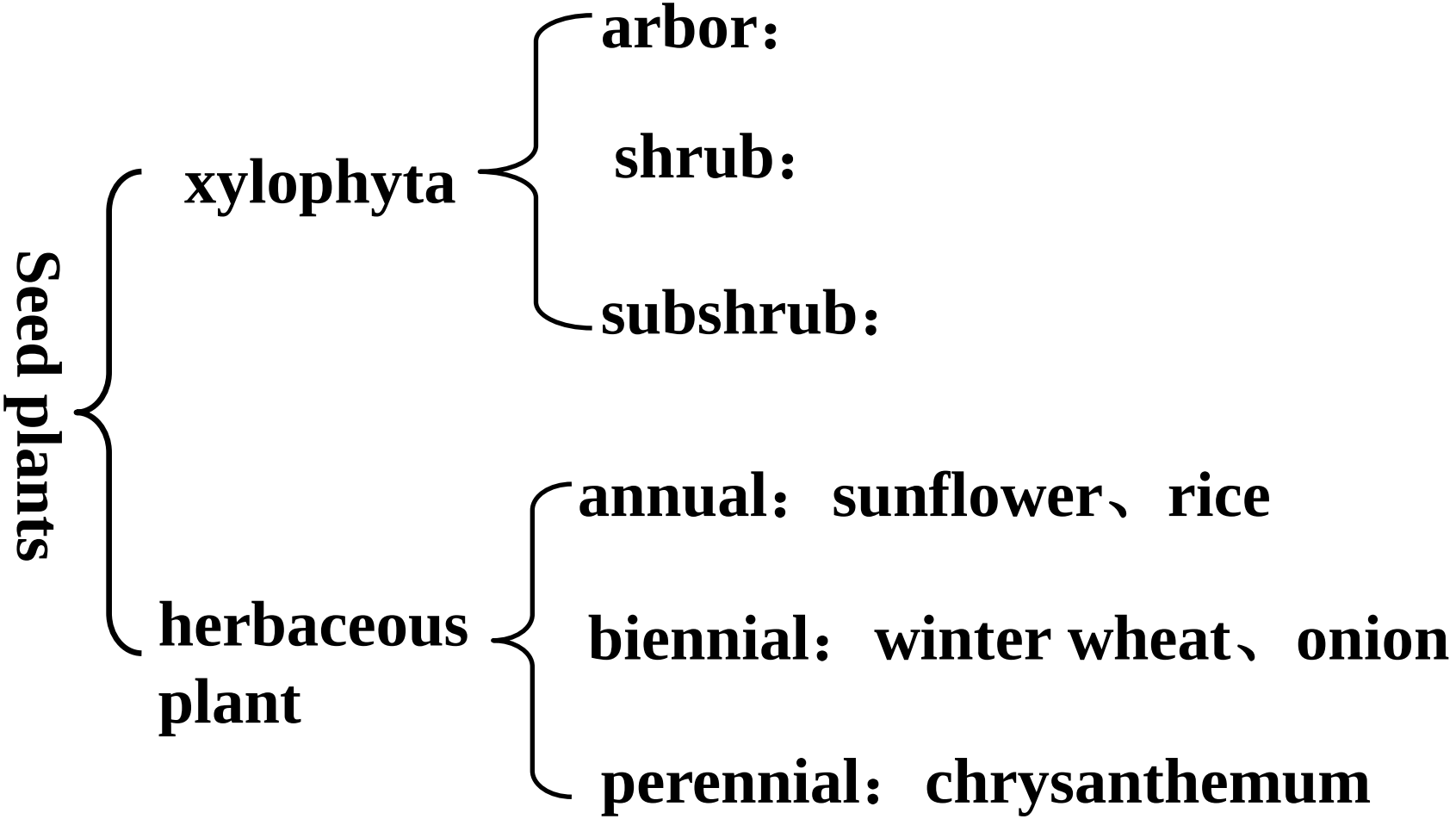


(5) Life circle：

Bacteria 20-30 minutes

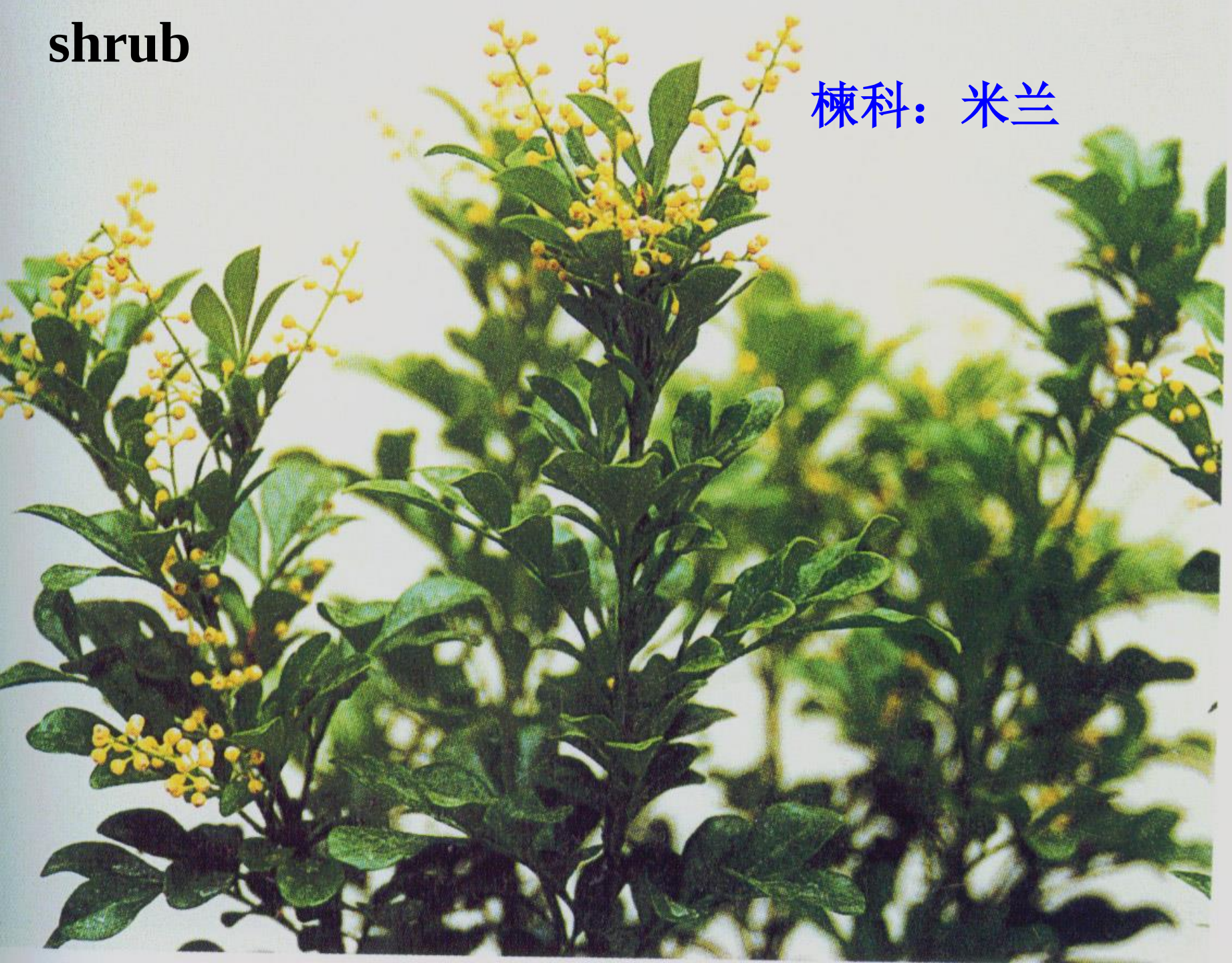
(6) Modes of nutrition： { **autotroph**; **heterotroph**

(7) Habits


Seed plants
xylophyta
arbor：
shrub：
subshrub：
herbaceous plant
annual：sunflower、rice
biennial：winter wheat、onion
perennial：chrysanthemum

Tropical arbor forest

shrub



楝科：米兰

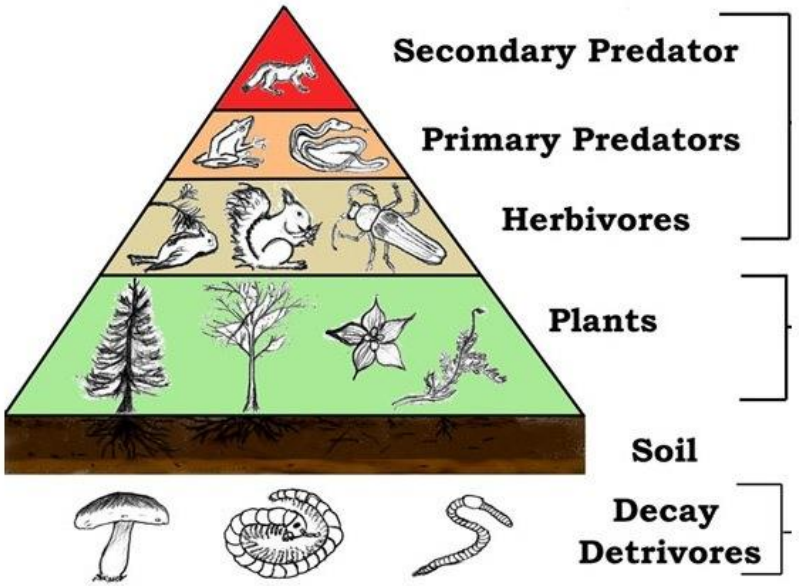
wheat

Sun flower

The Importance of Plants to humans & Nature

1. Importance of Plants in nature
2. They form the starting point of food chains:

In every food chain, the plants occupy the first position and lead the chain as a source of food.

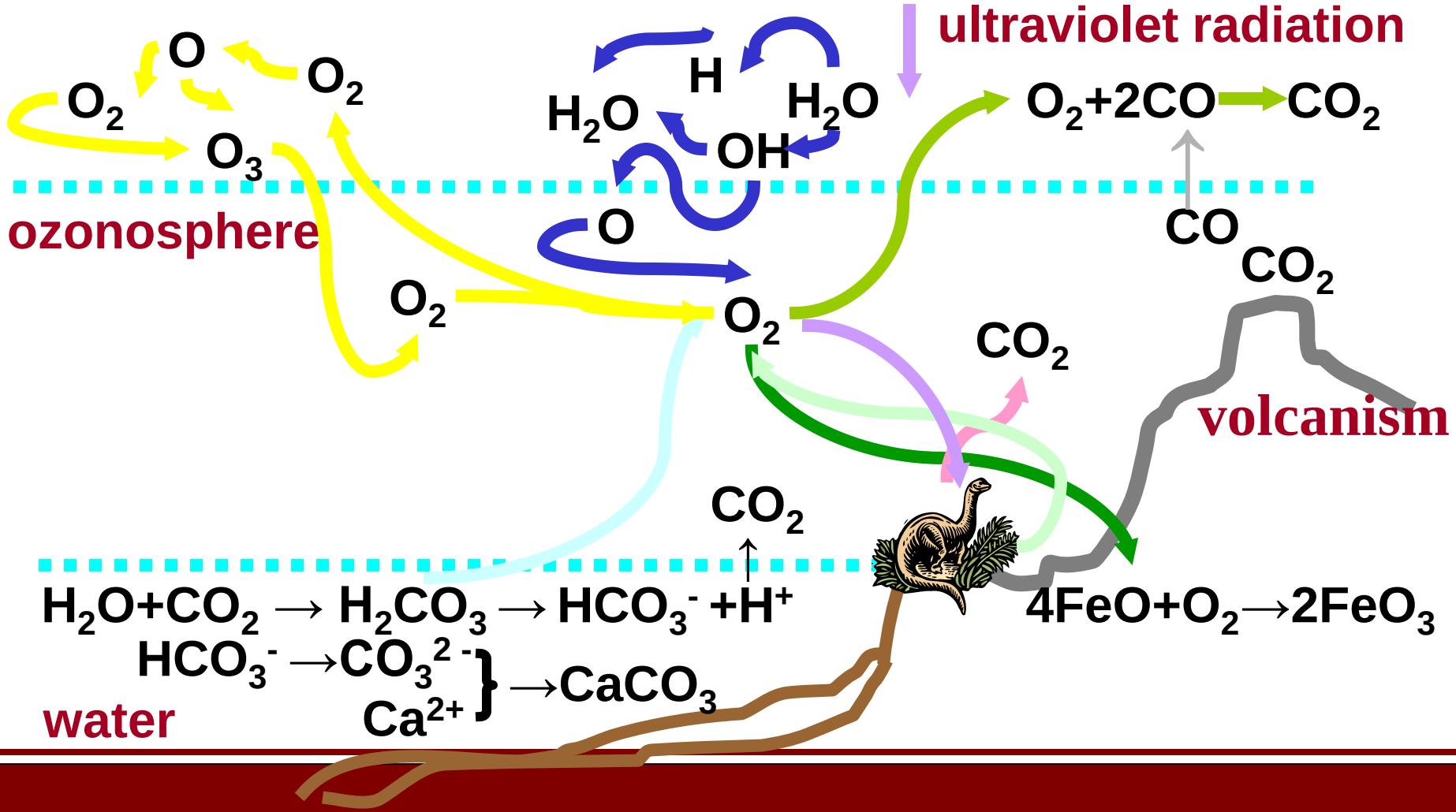


Grass → Insect → Frog→ Snake→ Eagle.

2. Gaseous balance:

Plants help maintain gaseous balance in the air. Animals emit carbon dioxide by taking in oxygen. This rise in carbon dioxide levels in air is reduced by plants. They consume carbon dioxide and release oxygen during photosynthesis. Thus oxygen the essential life force is kept intact on the earth due to plants alone.

oxygen cycle



2. Plants and humans

(1) provide rich materials and resources

Humanity's earliest concern with plants was with their practical uses, i.e., for fuel, clothing, shelter, and, particularly, food and drugs

(2) environmental protection

Bioconcentration is the accumulation of a chemical in or on an organism when the source of chemical is solely water.

Bioconcentration is a term that was created for use in the field of aquatic toxicology.

(3) Environmental monitoring

(4) Soil and water conservation


唐 菖 蒲

3. The contents of botany and its branch subject

3.1 What is botany

Botany is the scientific study of plant life. As a branch of biology, it is also sometimes referred to as plant science (s) or plant biology. Botany covers a wide range of scientific disciplines that study the growth, reproduction, metabolism, development, diseases, and evolution of plants.

Scope and motivation of botany

As with other life forms in biology, plant life can be studied at a variety of levels, from the molecular, genetic and biochemical level through organelles, cells, tissues, organs, individuals, plant populations, and communities of plants. At each of these levels a botanist might be concerned with the classification (taxonomy), structure (anatomy), or function (physiology) of plant life.

3.2 Branch subject

plant taxonomy

phylogenetic botany

plant morphology

plant physiology

plant genetics

plant ecology

phytochemistry

plant **resources**

molecular **botany**

4. The occurrence and development of plants

occurred： three thousand millions

development： 5 hundred thousand

evolution { **direction**; **rate** }

5. 植物学的发展简史

(1)17世纪(1665年)，英国的Robert Hooke利用显微镜观察植物材料。

(2)18世纪创立了植物分类系统和双名法。

(3)19世纪，德国的施莱登、施旺首次提出了“**细胞学说**”，认为动、植物的基本结构单位是细胞（cell）。

(4) 1859年达尔文《物种起源》推出进化论观点。

(5) 19世纪中叶，李善兰与外人合作编译《植物学》。

6. The classification

(1) The classification of plants

- artificial system

- natural system

➢(2) Classification unit of plants

	英文	拉丁文	学名字尾形式
• 界	kingdom	regnum	---
• 门	division	divisio	---- phyta
• 纲	class	classis	----opsida
• 目	order	ordo	----ales
• 科	family	familia	----aceae
• 属	genus	genus	---a,um,us
• 种	species	species	----

For example:

Kingdom …… 植物界 Regnum vegetabile

Phylum …… 被子植物门 Angiospermae

Class ……双子叶植物纲 Dicotyledoneae

Order ……毛茛目 Ranales

Family ……毛茛科 Ranunculaceae

Genus ……黄连属 *Coptis*

species … … …… … ……黄连 *Coptis chinensis* Franch.

The name of plants

同物异名

同名异物

How to name plant species

- 1. polynomial
- 2. Linnaean binomial system methods

International Code of Nomenclature

binomial system

scientific name

Linnaean binomial system of nomenclature

Binomial nomenclature, also called binominal nomenclature or binary nomenclature, is a formal system of naming species of living things by giving each a name composed of two parts (or three parts).

generic name + specific epithet+ first described

(3) main taxa of plants

(1) Bacteriophyta
(2) Cyanophyta
(3) Prochlorophyta

} 原核生物

(4) Euglenophyta
(5) Chlorophyta
(6) Charophyta
(7) Pyrrophyta
(8) Cryptophyta
(9) Chrysophyta
(10) Xanthophyceae
(11) Bacillariophyceae
(12) Phaeophyta
(13) Rhodophyta

} 真核藻类

绿裸黄金甲

红硅褐轮隐

14、Myxomycophyta
15、Eumycophyta
16、Lichens

} 菌物 Fungi

17、Bryophyta
18、Pteridophyta
19、Gymnospermae
20、Augiospermae

} 高等植物

孢子植物：真核藻类、苔藓植物、蕨类植物繁殖时不产生种子，以孢子（spore）进行繁殖。

种子植物：裸子植物和被子植物繁殖时产生种子(seed) 。

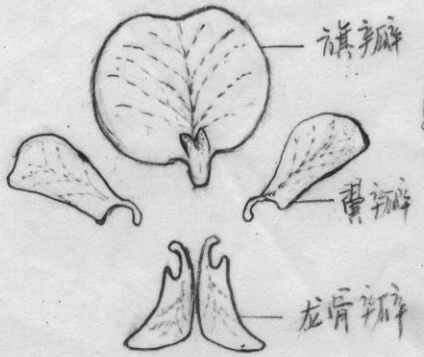
7. Methods of Learning

安徽师范大学

生命科学学院实验报告

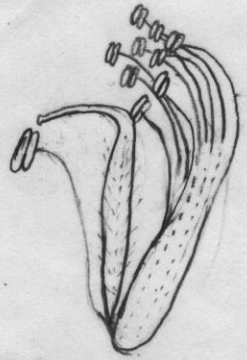
年 级：03级 学 号：0310234 姓 名：

实验二. 蔷薇亚纲(二)(三)

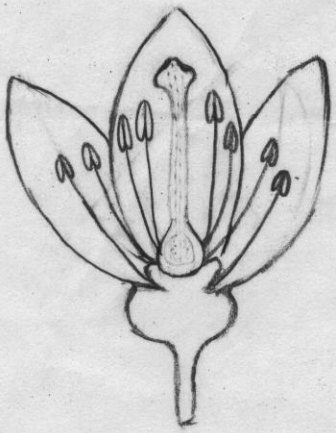


紫藤花瓣片

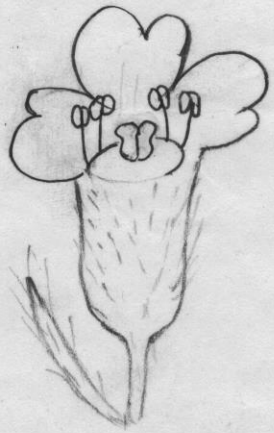
紫藤花图式



紫藤二体雄蕊外形图



相桔花纵剖面图



窗衣花外形图

Thank you !!!