

ZAPORIZHZHIA STATE MEDICAL UNIVERSITY
DEPARTMENT OF PHARMACOGNOSY, PHARMACOLOGY AND
BOTANY
DEPARTMENT OF FOREIGN LANGUAGES

*Yu. I. Kornievskyi, V. H. Kornievska, A. K. Kulichenko,
S. V. Panchenko, H. V. Mazulin*

PHARMACEUTICAL BOTANY

MANUAL

for the Unified State Qualification Examination (USQE), Stage 1.
the “Krok-1” Integrated Test-Based Exam and the English Language
Proficiency Test Preparation
for the Second and Third-Year Students of the Pharmaceutical Faculties,
Specialty 226 “Pharmacy, Industrial Pharmacy”,
Specialization “Technology of Perfumes and Cosmetics”

PART II



Zaporizhzhia
2021

UDC 58(075.8)

P 56

*Manual is approved and recommended for using in learning process by the Central Methodical Commission of Zaporizhzhia State Medical University
(record No. 5 from May, 27, 2021).*

Reviewers:

Mazulin O. V., DcSc (Pharmacy), Professor, Professor of Department of Clinical Pharmacy, Pharmacotherapy, Pharmacognosy and Pharmaceutical Chemistry, Faculty of Postgraduate Education, Zaporizhzhia State Medical University.

Shkoda S. O., PhD (Pharmacy), Associate Professor, Department of Biochemistry, Zaporizhzhia State Medical University.

Shramko R. H., PhD (Philology), Associate Professor, Department of English and German Philology, Poltava V.G. Korolenko National Pedagogical University.

Authors:

Korniievskiy Yu. I., PhD (Pharmacy), Associate Professor, Department of Pharmacognosy, Pharmacology and Botany, Zaporizhzhia State Medical University.

Korniievskaya V. H., PhD (Pharmacy), Associate Professor, Department of Pharmacognosy, Pharmacology and Botany, Zaporizhzhia State Medical University.

Kulichenko A. K., PhD (Pedagogics), Associate Professor, Department of Foreign Languages, Zaporizhzhia State Medical University.

Panchenko S. V., PhD (Pharmacy), Senior Lecturer, Department of Pharmacognosy, Pharmacology and Botany, Zaporizhzhia State Medical University.

Mazulin H. V., PhD (Pharmacy), Senior Lecturer, Department of Pharmacognosy, Pharmacology and Botany, Zaporizhzhia State Medical University.

P 56 **Pharmaceutical Botany.** Manual for the Unified State Qualification Examination (USQE), Stage 1. the “Krok-1” Integrated Test-Based Exam and the English Language Proficiency Test Preparation for the Second and Third-Year Students of the Pharmaceutical Faculties, Specialty 226 “Pharmacy, Industrial Pharmacy”, Specialization “Technology of Perfumes and Cosmetics”. Part II. / Yu. I. Korniievskiy, V. H. Korniievskaya, A. K. Kulichenko, S. V. Panchenko, H. V. Mazulin. – Zaporizhzhia, 2021. – 79 p.

The manual aims to prepare pharmaceutical students for the Unified State Qualification Examination (USQE), Stage 1 that consists of the following parts: the “Krok-1” Integrated Test-Based Exam and the English Language Proficiency Test.

UDC 58(075.8)

© Authors, 2021

© ZSMU, 2021

CONTENT

PREFACE	4
I. MAGNOLIOPHYTA DIVISION – THE FLOWERING PLANTS	5
1.1. The comparative characteristic of Magnoliopsida and Liliopsida	5
1.2. Latin names of medicinal plants in English	5
1.3. Scientific common names of plant	12
1.4. General features of families	17
II. DESCRIPTION EXAMPLES OF OF HERBAL SAMPLES OF MEDICINAL PLANTS	26
TESTS	35
GLOSSARY	63
REFERENCES	79

PREFACE

Pharmaceutical botany is one of the core disciplines within the training of pharmaceutical students. It deals with medicinal plants, their morphology, and the anatomical structure of plants.

The manual aims at the second and third-year students of the Pharmaceutical faculties, specialty 226 “Pharmacy, Industrial Pharmacy”, specialization “Technology of Perfumes and Cosmetics”. Besides, it is developed under the “Program on pharmaceutical botany” for students of higher pharmaceutical establishments and pharmaceutical faculties of higher medical educational establishments of the 3rd and 4th levels of accreditation.

The manual consists of the following parts: “Magnoliophyta division – The flowering plants”, “Description examples of herbal samples of medicinal plants. Besides, it contains figures and tests for each part as well as glossary and references.

The manual can be useful for students to prepare for practical classes, final graded tests, the Unified State Qualification Examination (USQE), Stage 1 for the students majoring in “Pharmacy” that consists of the following parts: the “Krok-1” Integrated Test-Based Exam and the English Language Proficiency Test.

I. MAGNOLIOPHYTA DIVISION – THE FLOWERING PLANTS

DICOTYLEDONES (MAGNOLIOPSIDA) CLASS

1.1. The comparative characteristic of Magnoliopsida and Liliopsida

<i>MAGNOLIOPSIDA CLASS</i>	<i>LILIOPSIDA CLASS</i>
An embryo is with two cotyledons that germinate, as a rule, aboveground.	An embryo is with one cotyledon that germinates, as a rule, underground.
Life forms are of wood and grass type (annual, biannual, perennial).	As a rule, there are grassy, sometimes secondary wood forms.
There is the tap, fibrous or mixed root system; it may be the underground metamorphosis.	There is the fibrous root system; it may be the underground metamorphosis.
Leaves are simple and compound with an entire or divided blade, often well-developed petiole and stipules.	Leaves are simple, entire, vaginal, without petioles and stipules.
There is the pinnate and palmate venation.	There is the parallel and arcuate venation.
There is the conducting system of vascular or non-vascular types.	There is the conducting system of the vascular type.
Bundles are situated in the circle; the cambium is present.	Bundles are situated irregularly; the cambium is absent.
Bark and pith are usually well developed.	The bark is not developed and pith parts, but not five.

1.2. Latin names of medicinal plants in English

№	Scientific Name	Common Name	Family
1.	Papaver somniferum	opium poppy	Papaveraceae / Poppy
2.	Glaucium flavum	yellow horned poppy or tulip poppy	Papaveraceae / Poppy
3.	Chelidonium majus	rock poppy or common celandine	Papaveraceae / Poppy
4.	Polygonum bistorta	snakeweed, snake-root, knotweed or serpent grass	Polygonaceae / Knotweed or Buckwheat
5.	Polygonum hydropiper	water pepper or biting knotweed	Polygonaceae / Knotweed or Buckwheat
6.	Polygonum persicaria	lady's thumb, spotted knotweed, common persicaria	Polygonaceae / Knotweed or Buckwheat

		or lover's- pride	
7.	<i>Polygonum aviculare</i>	bird's knotgrass or knotgrass	Polygonaceae / Knotweed or Buckwheat
8.	<i>Fagopyrum esculentum</i>	buckwheat	Polygonaceae / Knotweed or Buckwheat
9.	<i>Rheum tanguticus</i>	rhubarb or garden rhubarb	Polygonaceae / Knotweed or Buckwheat
10.	<i>Rumex confertus</i>	horse sorrel	Polygonaceae / Knotweed or Buckwheat
11.	<i>Brassica oleracea</i>	cabbage, cultivated cabbage or common head cabbage	Brassicaceae / Mustard or Crucifer
12.	<i>Erysimum diffusum</i>	treacle mustard or tarrify	Brassicaceae / Mustard or Crucifer
13.	<i>Capsella bursa-pastoris</i>	capsell or shepherd's purse	Brassicaceae / Mustard or Crucifer
14.	<i>Ledum palustre</i>	marsh tae or Labrador tae	Ericaceae / Heath or Heather
15.	<i>Vaccinium vitis-idaea</i>	mountain cranberry, cowberry or foxberry	Ericaceae / Heath or Heather
16.	<i>Oxycoccus palustris</i>	European cranberry or wild cranberry	Ericaceae / Heath or Heather
17.	<i>Arctostaphylos uva-ursi</i>	bearberry	Ericaceae / Heath or Heather
18.	<i>Vaccinium myrtillus</i>	bilberry or whortleberry	Ericaceae / Heath or Heather
19.	<i>Schizandra chinensis</i>	Chinese magnolia-vine or schizandra	Schizandraceae / Schizandra
20.	<i>Adonis vernalis</i>	spring Adonis	Ranunculaceae / Buttercup
21.	<i>Quercus robur</i>	oak or English oak	Fagaceae / Oak
22.	<i>Betula pendula</i>	common birch or white birch	Betulaceae / Birch
23.	<i>Alnus glutinosa</i>	alder or European black alder	Betulaceae / Birch
24.	<i>Juglans regia</i>	common walnut	Juglandaceae / Walnut
25.	<i>Hypericum perforatum</i>	perforate St. John's-wort or common Saint John's wort	Hypericaceae / St. John's Wort
26.	<i>Tilia cordata</i>	little-leaf linden	Tiliaceae / Linden
27.	<i>Althaea officinalis</i>	marshmallow, mortification root or white mallow	Malvaceae / Mallow
28.	<i>Humulus lupulus</i>	common hop, wild	Cannabaceae / Hop or Hemp

		hop or hop	
29.	<i>Urtica dioica</i>	common nettle or greater nettle	Urticaceae / Nettle
30.	<i>Aronia melanocarpa</i>	black chokeberry	Rosaceae / Rose (Subfamily)-Maloideae / Apple
31.	<i>Crataegus sanguinea</i>	hawthorn or maybush	Rosaceae / Rose (Subfamily)-Maloideae / Apple
32.	<i>Fragaria vesca</i>	strawberry or European wood strawberry	Rosaceae / Rose (Subfamily)-Rosoideae / Rose
33.	<i>Sanguisorba officinalis</i>	burnet	Rosaceae / Rose (Subfamily)-Rosoideae / Rose
34.	<i>Potentilla erecta</i>	tormentil	Rosaceae / Rose (Subfamily)-Rosoideae / Rose
35.	<i>Rubus idaeus</i>	raspberry or common raspberry	Rosaceae / Rose (Subfamily)-Rosoideae / Rose
36.	<i>Amygdalus communis</i>	almond or almond tree	Rosaceae / Rose (Subfamily)-Prunoideae / Plum
37.	<i>Persica vulgaris</i>	peach or peach tree	Rosaceae / Rose (Subfamily)-Prunoideae / Plum
38.	<i>Sorbus aucuparia</i>	mountain ash or rowan	Rosaceae / Rose (Subfamily)-Maloideae / Apple
39.	<i>Prunus domestica</i>	garden plum	Rosaceae / Rose (Subfamily)-Prunoideae / Plum
40.	<i>Prunus spinosa</i>	blackthorn or black thorn	Rosaceae / Rose (Subfamily)-Prunoideae / Plum
41.	<i>Padus avium</i>	bird cherry, haggberry or Mayday tree	Rosaceae / Rose (Subfamily)-Prunoideae / Plum
42.	<i>Rosa majalis</i>	cinnamon rose or May rose	Rosaceae / Rose (Subfamily)-Rosoideae / Rose
43.	<i>Rosa canina</i>	dog rose	Rosaceae / Rose (Subfamily)-Rosoideae /

			Rose
44.	<i>Malus domestica</i>	apple tree	Rosaceae / Rose (Subfamily)-Maloideae / Apple
45.	<i>Arachis hypogaea</i>	peanut	Fabaceae / Legume or Bean
46.	<i>Astragalus dasyanthus</i>	milk-vetch or locoweed	Fabaceae / Legume or Bean
47.	<i>Pisum sativum</i>	garden pea	Fabaceae / Legume or Bean
48.	<i>Melilotus officinalis</i>	melilot or sweet clover	Fabaceae (Leguminosae) / Legumen or Bean
49.	<i>Robinia pseudoacacia</i>	black locust or false acacia	Fabaceae (Leguminosae) / Legumen or Bean
50.	<i>Glycyrrhiza glabra</i>	licorice or sweet root	Fabaceae (Leguminosae) / Legumen or Bean
51.	<i>Glycine max</i>	soya bean or soya	Fabaceae (Leguminosae) / Legumen or Bean
52.	<i>Ononis arvensis</i>	rest-harrow	Fabaceae (Leguminosae) / Legumen or Bean
53.	<i>Thermopsis lanceolata</i>	thermopsis	Fabaceae (Leguminosae) / Legumen or Bean
54.	<i>Phaseolus vulgaris</i>	kidney bean	Fabaceae (Leguminosae) / Legumen or Bean
55.	<i>Aesculus hippocastanum</i>	horse chestnut or common horsechestnut	Hippocastanaceae / Horse Chestnut
56.	<i>Linum usitatissimum</i>	common flax	Linaceae / Flax
57.	<i>Rhamnus cathartica</i>	Buckthorn, hart's- thorn or waythorn	Rhamnaceae / Buckthorn
58.	<i>Hippophae rhamnoides</i>	sea buckthorn	Elaeagnaceae / Oleaster
59.	<i>Anisum vulgare</i>	anise	Apiaceae / Carrot, Caraway, Celery, Parsley or Dill
60.	<i>Conium maculatum</i>	hemlock or poison hemlock	Apiaceae / Carrot, Caraway, Celery, Parsley or Dill
61.	<i>Coriandrum sativum</i>	coriander	Apiaceae / Carrot, Caraway, Celery, Parsley or Dill
62.	<i>Daucus sativus</i>	carrot or garden carrot	Apiaceae / Carrot, Caraway, Celery, Parsley or Dill
63.	<i>Petroselinum sativum</i>	parsley	Apiaceae / Carrot, Caraway, Celery, Parsley or Dill
64.	<i>Apium graveolens</i>	celery	Apiaceae / Carrot, Caraway, Celery, Parsley or Dill
65.	<i>Carum carvi</i>	caraway	Apiaceae / Carrot, Caraway, Celery, Parsley or Dill
66.	<i>Anethum graveolens</i>	dill	Apiaceae / Carrot, Caraway,

			Celery, Parsley or Dill
67.	<i>Foeniculum vulgare</i>	fennel	Apiaceae / Carrot, Caraway, Celery, Parsley or Dill
68.	<i>Cicuta virosa</i>	cowbane, species of cicuta or water hemlock	Apiaceae / Carrot, Caraway, Celery, Parsley or Dill
69.	<i>Viburnum opulus</i>	common snowball, high cranberry or marsh elder	Viburnaceae / Viburnum
70.	<i>Sambucus nigra</i>	European elder	Sambucaceae / Elder
71.	<i>Valeriana officinalis</i>	common valerian, cat's valerian or vandalroot	Valerianaceae / Valerian
72.	<i>Vinca minor</i>	lesser periwinkle	Apocynaceae / Periwinkle
73.	<i>Hyoscyamus niger</i>	hog-bean, poison tobacco, belene, hog's-been or henbane	Solanaceae / Potato or Nightshade
74.	<i>Datura stamonium</i>	datura, stamonium, jimsonweed or thorn apple	Solanaceae / Potato or Nightshade
75.	<i>Atropa belladonna</i>	belladonna or deadly nightshade	Solanaceae / Potato or Nightshade
76.	<i>Solanum tuberosum</i>	potato	Solanaceae / Potato or Nightshade
77.	<i>Verbascum densiflorum</i>	mullein or denseflower mullein	Scrophulariaceae / Figwort
78.	<i>Digitalis grandiflora</i>	common foxglove	Scrophulariaceae / Figwort
79.	<i>Plantago major</i>	common plantain, lamb's-foot or greater plantain	Plantaginaceae / Plantain
80.	<i>Origanum vulgare</i>	oregano	Lamiaceae / Mint or Deadnettle
81.	<i>Lavandula angustifolia</i>	lavender	Lamiaceae / Mint or Deadnettle
82.	<i>Melissa officinalis</i>	bergamot mint or lemon balm	Lamiaceae / Mint or Deadnettle
83.	<i>Mentha piperita</i>	peppermint or brandy mint	Lamiaceae / Mint or Deadnettle
84.	<i>Leonurus quinquelobatus</i>	quinquelobate motherwort or lion's-ear	Lamiaceae / Mint or Deadnettle
85.	<i>Rosmarinus officinalis</i>	compass-weed dew of the sea, draft	Lamiaceae / Mint or Deadnettle

		rosemary or rosemary	
86.	<i>Thymus vulgaris</i>	common thyme	Lamiaceae / Mint or Deadnettle
87.	<i>Thymus serpyllum</i>	creeping thyme	Lamiaceae / Mint or Deadnettle
88.	<i>Salvia officinalis</i>	garden sage	Lamiaceae / Mint or Deadnettle
89.	<i>Arnica montana</i>	arnica, mountain arnica, leopard's bane or wolf's bane	Asteraceae / Aster or Sunflower
90.	<i>Inula helenium</i>	elecampane	Asteraceae / Aster or Sunflower
91.	<i>Arctium lappa</i>	great burdock, edible burdock, beggar's button or fox's clote	Asteraceae / Aster or Sunflower
92.	<i>Tussilago farfara</i>	coltsfoot, clayweed, horsefoof or son- foot	Asteraceae / Aster or Sunflower
93.	<i>Calendula officinalis</i>	pot marigold, calendula or English marigold	Asteraceae / Aster or Sunflower
94.	<i>Taraxacum officinale</i>	common dandelion or milk-witch gowan	Asteraceae / Aster or Sunflower
95.	<i>Tanacetum vulgare</i>	tansy, common tansy, gold-button or pyrethrym	Asteraceae / Aster or Sunflower
96.	<i>Helianthus annuus</i>	sunflower, common sunflower or feeding sunflower	Asteraceae / Aster or Sunflower
97.	<i>Helianthus tuberosus</i>	Earth apple, Jerusalem potato or topsnambour	Asteraceae / Aster or Sunflower
98.	<i>Artemisia absinthium</i>	absinthe or wormwood	Asteraceae / Aster or Sunflower
99.	<i>Artemisia vulgaris</i>	mugwort	Asteraceae / Aster or Sunflower
100.	<i>Silybum marianum</i>	Lady's-milk, blessed Thistle, blessed milkthistle or spotted thistle	Asteraceae / Aster or Sunflower
101.	<i>Achillea submillefolium</i>	common yarrow, arrow root or milfoil	Asteraceae / Aster or Sunflower

102.	<i>Chamomilla suaveolens</i>	wild marigold or false chamomile	Asteraceae / Aster or Sunflower
103.	<i>Chamomilla recutita</i>	matricaria, common chamomile or wild chamomile	Asteraceae / Aster or Sunflower
104.	<i>Cichorium intybus</i>	common chicory, blue daisy, succory or wild succory	Asteraceae / Aster or Sunflower
105.	<i>Helichrysum arenarium</i>	everlasting, yellow everlasting, daisy dwarf everlasting or yellow chaste weed	Asteraceae / Aster or Sunflower
106.	<i>Bidens tripartita</i>	beggar-ticks, bur marigold or water hemp	Asteraceae / Aster or Sunflower
107.	<i>Echinacea purpurea</i>	coneflower, echinacea or black sampson	Asteraceae / Aster or Sunflower
108.	<i>Allium sativum</i>	garlic	Alliaceae / Onion
109.	<i>Allium cepa</i>	onion	Alliaceae / Onion
110.	<i>Convallaria majalis</i>	lily-of the -valley or May lily	Convallariaceae / Lilli-of-the-Valley
111.	<i>Zea mays</i>	corn or maize	Poaceae / Grass
112.	<i>Avena sativa</i>	Oat	Poaceae / Grass
113.	<i>Triticum aestivum</i>	soft wheat	Poaceae / Grass
114.	<i>Elytrigia repens</i>	quitch, couch grass or dog's grass	Poaceae / Grass
115.	<i>Oryza sativa</i>	rise	Poaceae / Grass
116.	<i>Acorus calamus</i>	calamus, sweet flag, sedge grass, sedge root or sea sedge	Araceae / Arum
117.	<i>Ginkgo biloba</i>	ginkgo or maidenhair tree	Ginkgoaceae / Ginkgo
118.	<i>Picea abies</i>	Norway spruce or Christmas tree	Pinaceae / Pine
119.	<i>Larix sibirica</i>	Siberian larch	Pinaceae / Pine
120.	<i>Pinus sylvestris</i>	Scotch pine, common pine or pine tree	Pinaceae / Pine
121.	<i>Juniperus communis</i>	common juniper	Cupressaceae / Cypress
122.	<i>Taxus baccata</i>	common yew English yew	Taxaceae / Yew
123.	<i>Sphagnum palustre</i>	prairie sphagnum or blunt-leaved	Sphagnaceae / Moss

		bogmoss	
124.	<i>Lycopodium clavatum</i>	common club moss or toad's-tail	Lycopodiaceae / Clubmoss
125.	<i>Equisetum arvense</i>	horsetail	Equisetaceae / Horsetail
126.	<i>Dryopteris filix-mas</i>	male fern, male shield fern or shield- root	Aspidiaceae / Buckler-Fern, Wood Fern

1.3. *Scientific common names of plant*

№	Scientific Name	Common Name	Family
1.	<i>Abies sibirica</i> Ledeb.	Siberian fir	Pinaceae
2.	<i>Achillea submillefolium</i> L. p.p.	yarrow	Asteraceae (Compositae)
3.	<i>Aconium napellus</i> L.	monkshood	Ranunculaceae
4.	<i>Acorus calamus</i> L.	sweet flag	Acoraceae
5.	<i>Adonis vernalis</i> L.	spring adonis	Ranunculaceae
6.	<i>Aesculus hippocastanum</i> L.	horse chestnut	Hippocastanaceae
7.	<i>Allium cepa</i> L.	onion	Alliaceae
8.	<i>Allium sativum</i> L.	garlic	Alliaceae
9.	<i>Alnus glutinosa</i> (L.) P. Gaertn.	European alder	Betulaceae
10.	<i>Alnus incana</i> (L.) Moench	grey alder	Betulaceae
11.	<i>Aloe vera</i> (L.) Burm. f.	bitter aloe	Aloaceae
12.	<i>Althaea officinalis</i> L.	marshmallow	Malvaceae
13.	<i>Anethum graveolens</i> L.	dill	Apiaceae (Umbelliferae)
14.	<i>Anisum vulgare</i> Gaertn.	common anise	Apicaceae (Umbelliferae)
15.	<i>Apium graveolens</i> L.	wild celery	Apicaceae (Umbelliferae)
16.	<i>Arachis hypogaea</i> L.	peanut	Fabaceae (Leguminosae)
17.	<i>Arctium lappa</i> L.	great burdock	Asteraceae (Compositae)
18.	<i>Arctostaphylos uva- arsi</i> (L.) Spreng	bearberry	Ericaceae
19.	<i>Armeniaca vulgaris</i> Lam.	apricot	Rosaceae
20.	<i>Arnica montana</i> L.	mountain arnica	Asteraceae (Compositae)
21.	<i>Aronia melanocarpa</i> (Minch.) Eliot.	black chokeberry	Rosaceae
22.	<i>Artemisia absinthium</i>	wormwood	Asteraceae (Compositae)

	L.		
23.	<i>Artemisia vulgaris</i> L.	mugwort	Asteraceae (Compositae)
24.	<i>Atropa belladonna</i> L.	deadly night-shade	Solanaceae
25.	<i>Avena sativa</i> L.	oats	Poaceae (Gramineae)
26.	<i>Berberis vulgaris</i> L.	barberry	Berberidaceae
27.	<i>Bergenia crassifolia</i> (L.) Fritsch	leather bergenia	Saxifragaceae
28.	<i>Betula pendula</i> Roth.	silver birch	Betulaceae
29.	<i>Bidens tripartita</i> L.	trifid bur-marigold	Asteraceae (Compositae)
30.	<i>Borago officinalis</i> L.	borage	Boraginaceae
31.	<i>Brassica juncea</i> (L.) Czern.	Chinense (Indian) mustard	Brassicaceae (Cruciferae)
32.	<i>Brassica nigra</i> (L.) Koch.	black mustard	Brassicaceae (Cruciferae)
33.	<i>Brassica oleracea</i> L.	wild cabbage	Brassicaceae (Cruciferae)
34.	<i>Bryophyllum</i> <i>pinnatum</i> (Lam.) Oken.	cathedral bells	Crassulaceae
35.	<i>Calendula officinalis</i> L.	marigold	Asteraceae (Compositae)
36.	<i>Capsella bursa-pastoris</i> (L.) Medik.	Shepherd's purse	Brassicaceae (Cruciferae)
37.	<i>Capsicum annuum</i> L.	sweet pepper	Solanaceae
38.	<i>Carum carvi</i> L.	caraway	Apiaceae (Umbelliferae)
39.	<i>Cassia acutifolia</i> Del.	senna	Fabaceae (Leguminosae)
40.	<i>Cassia</i> <i>angustifolia</i> Vahl.	Indian senna	Fabaceae (Leguminosae)
41.	<i>Centaurea cyanus</i> L.	cornflower	Asteraceae (Compositae)
42.	<i>Centaurium erythraea</i> Rafn.	common centaury	Gentianaceae
43.	<i>Cerasus vulgaris</i> Mill.	cherry	Rosaceae
44.	<i>Chamomilla recutita</i> (L.) Rauschert	common chamomile	Asteraceae (Compositae)
45.	<i>Chamomilla</i> <i>suaveolens</i> (Pursh) Rydb.	rounded chamomile	Asteraceae (Compositae)
46.	<i>Chelidonium majus</i> L.	greater celandine	Papaveraceae
47.	<i>Cichorium intybus</i> L.	chicory	Asteraceae (Compositae)
48.	<i>Cicuta virosa</i> L.	cowbane	Apiaceae (Umbelliferae)
49.	<i>Citrus limon</i> (L.) Burm. f.	lemon	Rutaceae

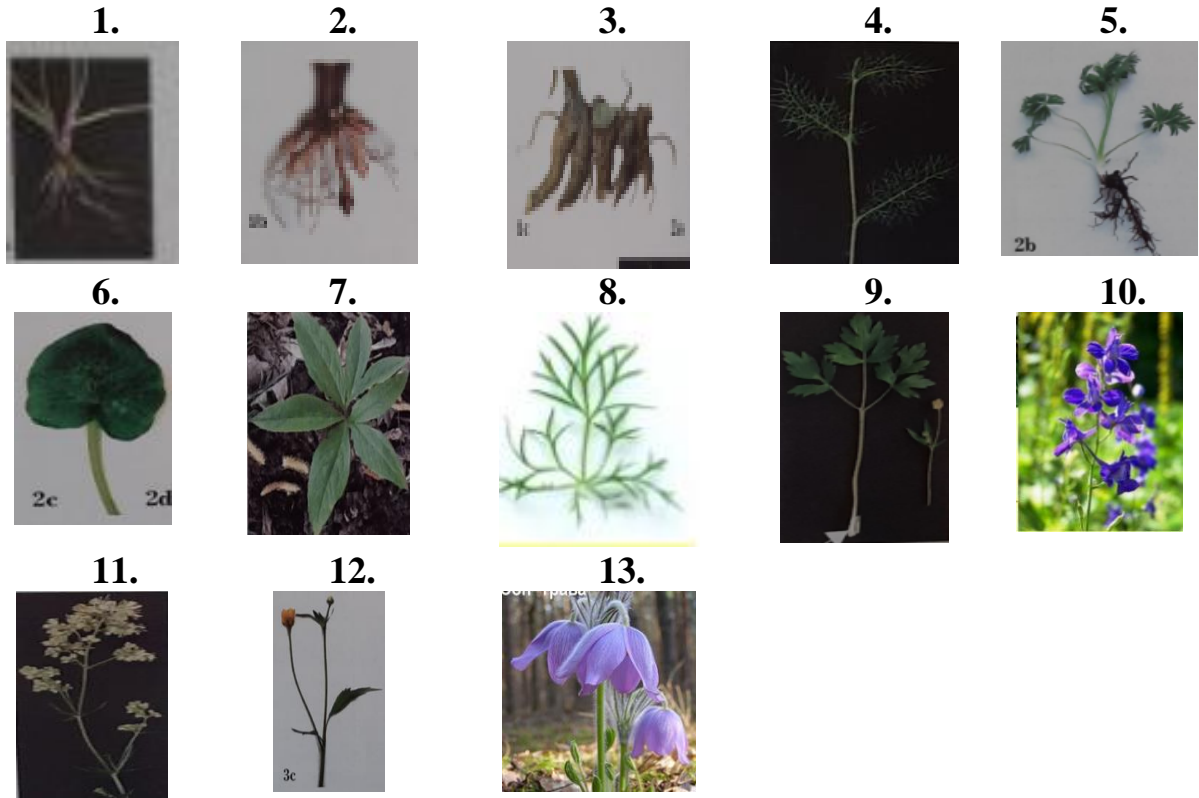
50.	<i>Conium maculatum</i> L.	hemlock	Apiaceae (Umbelliferae)
51.	<i>Consolida regalis</i> S. F. Gray	forked lakspur	Ranunculaceae
52.	<i>Convallaria majalis</i> L.	lily-of-the-valley	Convallariaceae
53.	<i>Coriandrum sativum</i> L.	coriander	Apiaceae (Umbelliferae)
54.	<i>Crataegus sanguinea</i> Pall.	redhaw	Rosaceae
55.	<i>Cucurbita pepo</i> L.	pumpkin	Cucurbitaceae
56.	<i>Datura stramonium</i> L.	common thorn apple	Solanaceae
57.	<i>Daucus carota</i> L.	carrot	Apiaceae (Umbelliferae)
58.	<i>Digitalis ferruginea</i> L.	rusty foxglove	Scrophulariaceae
59.	<i>Digitalis grandiflora</i> Mill.	large yellow foxglove	Scrophulariaceae
60.	<i>Digitalis lanata</i> Ehrh.	woolly foxglove	Scrophulariaceae
61.	<i>Digitalis purpurea</i> L.	foxglove	Scrophulariaceae
62.	<i>Dioscorea nipponica</i> Makino	Japanese yam	Dioscoreaceae
63.	<i>Dryopteris filix-mas</i> (L.) Schott.	male fern	Dryopteridaceae
64.	<i>Echinacea purpurea</i> (L.) Moench	purple coneflower	Asteraceae (Compositae)
65.	<i>Echinops ritro</i> L.	globe-thistle	Asteraceae (Compositae)
66.	<i>Elytrigia repens</i> (L.) Nevski	couchgrass	Poaceae (Gramineae)
67.	<i>Ephedra distachya</i> L.	ephedra	Ephedraceae
68.	<i>Ephedra equisetina</i> Bunge	Mongolian ephedra	Ephedraceae
69.	<i>Equisetum arvense</i> L.	field horsetail	Equisetaceae
70.	<i>Equisetum palustre</i> L.	marsh horsetail	Equisetaceae
71.	<i>Erysimum diffusum</i> Ehrh.	treacle mustard	Brassicaceae (Cruciferae)
72.	<i>Eucalyptus globulus</i> Labil.	eucalyptus	Myrtaceae
73.	<i>Fagopyrum esculentum</i> Moench	buckwheat	Polygonaceae
74.	<i>Foeniculum vulgare</i> Mill.	fennel	Apiaceae (Umbelliferae)
75.	<i>Fragaria vesca</i> L.	wild strawberry	Rosaceae
76.	<i>Frangula alnus</i> Mill.	alder buckthorn	Rhamnaceae
77.	<i>Ginkgo biloba</i> L.	maidenhair tree	Ginkgoaceae
78.	<i>Glaucium flavum</i>	yellow horned poppy	Papaveraceae

	Crantz.		
79.	<i>Glycyrrhiza glabra</i> L.	liquorice	Fabaceae (Leguminosae)
80.	<i>Helianthus annuus</i> L.	sunflower	Asteraceae (Compositae)
81.	<i>Helianthus tuberosus</i> L.	Jerusalem artichoke	Asteraceae (Compositae)
82.	<i>Helichrysum arenarium</i> (L.) Moench	yellow everlasting daisy	Asteraceae (Compositae)
83.	<i>Helleborus purpurascens</i> Waldst. Et Kit.	hellebore	Ranunculaceae
84.	<i>Hippophaë rhamnoides</i> L.	sea buckthorn	Elaeagnaceae
85.	<i>Humulus lupulus</i> L.	hop	Cannabaceae
86.	<i>Hyoscyamus niger</i> L.	henbane	Solanaceae
87.	<i>Hypericum perforatum</i> L.	common St. John's-wort	Clusiaceae
88.	<i>Inula helenium</i> L.	elecampane	Asteraceae (Compositae)
89.	<i>Iris germanica</i> L.	common iris	Iridaceae
90.	<i>Iris pseudacorus</i> L.	yellow iris	Iridaceae
91.	<i>Juglans regia</i> L.	Persian walnut	Juglandaceae
92.	<i>Juniperus communis</i> L.	juniper	Cupressaceae
93.	<i>Laminaria japonica</i> Aresch.	Japanese kelp	Laminariaceae
94.	<i>Lamium album</i> L.	white deadnettle	Lamiaceae (Labiatae)
95.	<i>Larix sibirica</i> (Munch.) Ledeb.	Siberian larch	Pinaceae
96.	<i>Lavandula angustifolia</i> Mill.	English lavender	Lamiaceae (Labiatae)
97.	<i>Ledum palustre</i> L.	wild rosemary	Ericaceae
98.	<i>Leonurus cardiaca</i> L.	motherwort	Lamiaceae (Labiatae)
99.	<i>Leonurus quinquelobatus</i> Gilib.	motherwort	Lamiaceae (Labiatae)
100	<i>Linaria vulgaris</i> Mill.	common toadflax	Scrophulariaceae
101	<i>Linum usitatissimum</i> L.	flax	Linaceae
102	<i>Lycopodium clavatum</i> L.	club moss	Lycopodiaceae
103	<i>Malus domestica</i> Borkh	apple	Rosaceae
104	<i>Melilotus officinalis</i> (L.) Pall.	sweet clover	Fabaceae (Leguminosae)
105	<i>Melissa officinalis</i> L.	lemon balm	Lamiaceae (Labiatae)

106	<i>Mentha piperita</i> L.	peppermint	Lamiaceae (Labiatae)
107	<i>Ononis arvensis</i> L.	spiny restharrow	Fabaceae (Leguminosae)
108	<i>Origanum vulgare</i> L.	oregano	Lamiaceae (Labiatae)
109	<i>Orthosiphon stamineus</i> Benth.	java tea	Lamiaceae (Labiatae)
110	<i>Oryza sativa</i> L.	rice	Poaceae (Gramineae)
111	<i>Plantago lanceolata</i> L.	ribwort plantain	Plantaginaceae
112	<i>Plantago psyllium</i> L.	psyllium	Plantaginaceae
113	<i>Polemonium caeruleum</i> L.	Jacob's-ladder	Polemoniaceae
114	<i>Raphanus sativus</i> L. var. <i>radicula</i> Pers.	radish	Brassicaceae (Cruciferae)
115	<i>Rauwolfia canescens</i> L.	four leaf devilpepper	Apocynaceae
116	<i>Ribes nigrum</i> L.	black currant	Grossulariaceae
117	<i>Saponaria officinalis</i> L.	soapwort	Caryophyllaceae
118	<i>Scopolia carniolica</i> Jacq.	European scopolia	Solanaceae
119	<i>Secale cereale</i> L.	rye	Poaceae (Gramineae)
120	<i>Trigonella foenum-graecum</i> L.	fenugreek	Fabaceae (Leguminosae)
121	<i>Triticum aestivum</i> L.	wheat	Poaceae (Gramineae)
123	<i>Verbascum phlomoides</i> L.	orange mullein	Scrophulariaceae
124	<i>Viburnum opulus</i> L.	guelder-rose	Viburnaceae

1.4. General features of families

Dicots Class Ranunculidae Subclass The Ranunculaceae Family



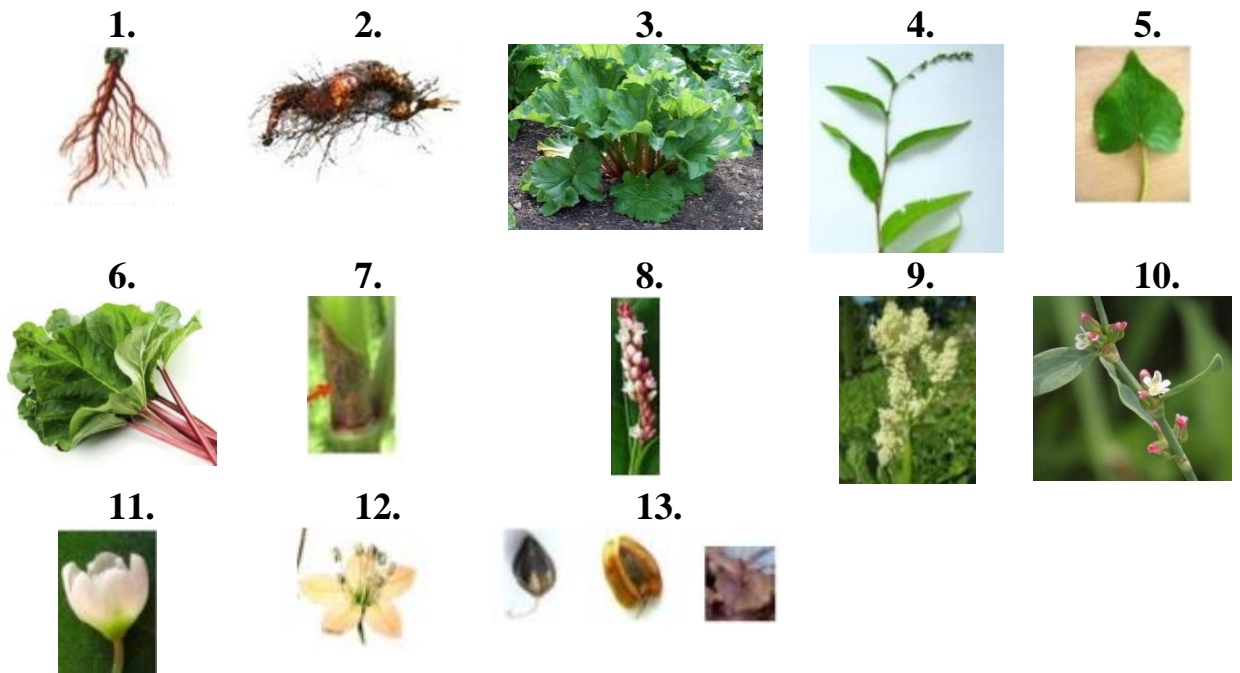
1 – fibrous root system; 2 – pips; 3 – rhizomes with pips; 4 – alternate leaves; 5 – leaf rosette; 6 – entire lamina; 7 – palmatisected leaves; 8 – pinnatifid leaf; 9 – heterophylly; 10 – raceme; 11 – panicle; 12 – monochasium; 13 – flower with the simple perianth.

The Papaveraceae Family (Poppy)



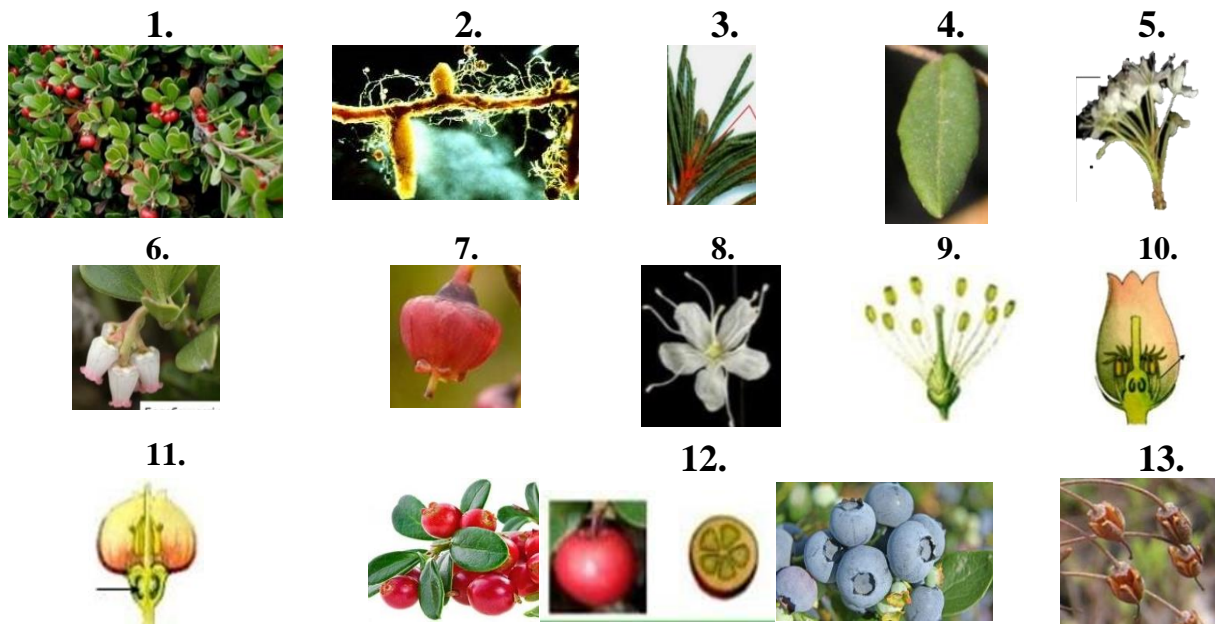
1 – tap root system; 2 – radical rosette; 3 – stem sessil; 4 – diagram flower; 5 – flower bud with the calyx; 6 – top view of flower; 8 – gynoecium cenocarpous; 9 – capsule; 10 – siliqua-like capsule; 11 – laticifers.

**Caryophyllidae Subclass
Polygonaceae Family**



1 – tap root system; 2 – rhizome; 3 – radical rosette; 4 – alternate leaves; 5 – entire leaf; 6 – divided leaf; 7 – ocrea; 8 – spike; 9 – compound terminal panicle; 10 – axillary flowers; 11 – diagram flower; 12 – with the simple perianth; 13 – nuts.

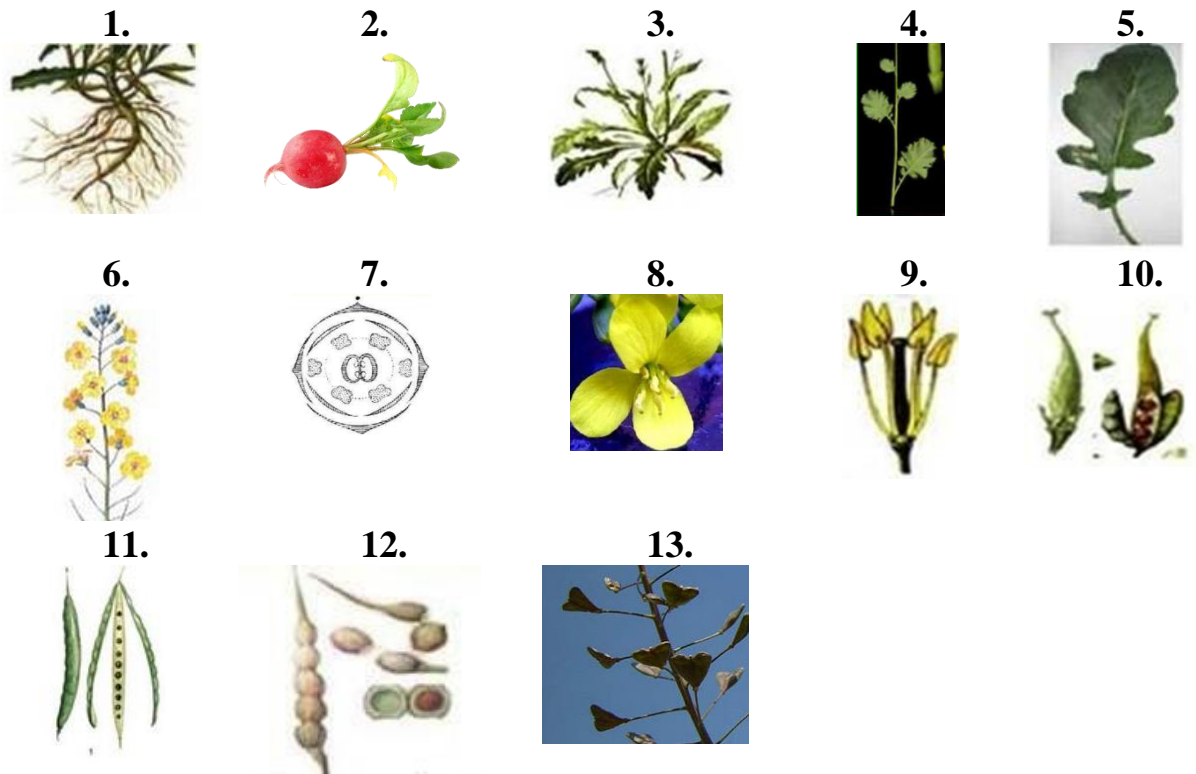
The Ericaceae Family



1 – life form is dwarf semishrub; 2 – root with mycorrhiza; 3 – needle-like leaf; 4 – leaf with the declinate edge; 5 – corymb; 6 – raceme; 7 – bell-shaped corolla;

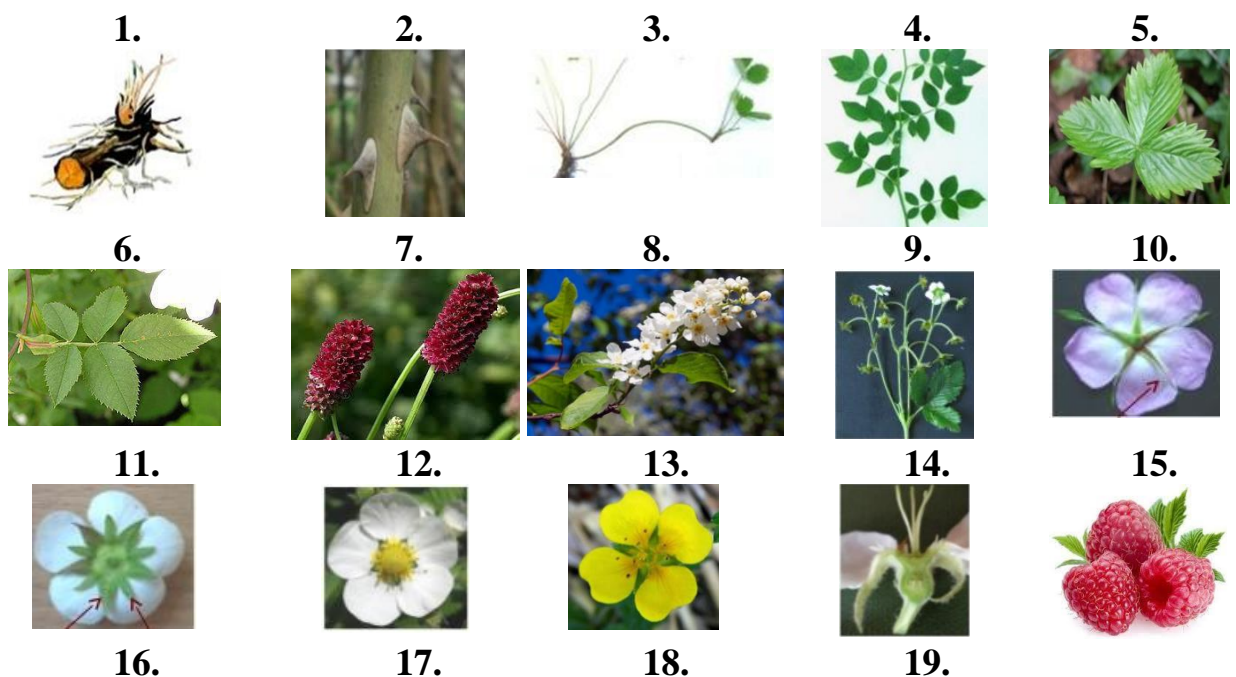
8 – stellar pentamerous corolla; 9 – free stamens and cenocarpous gynoecium; 10 – superior ovary; 11 – inferior ovary; 12 – berry; 13 – capsule.

The Brassicaceae Family



1 – tap root system; 2 – storage root; 3 – radical rosette; 4 – alternate leaf position; 5 – pinnatisected leaf; 6 – raceme; 7 – diagram of flower; 8 – double perianth; 9 – tetradymous androecium; 10 – cenocarpous gynoecium; 11 – silique; 12 – loment silique; 13 – silicle.

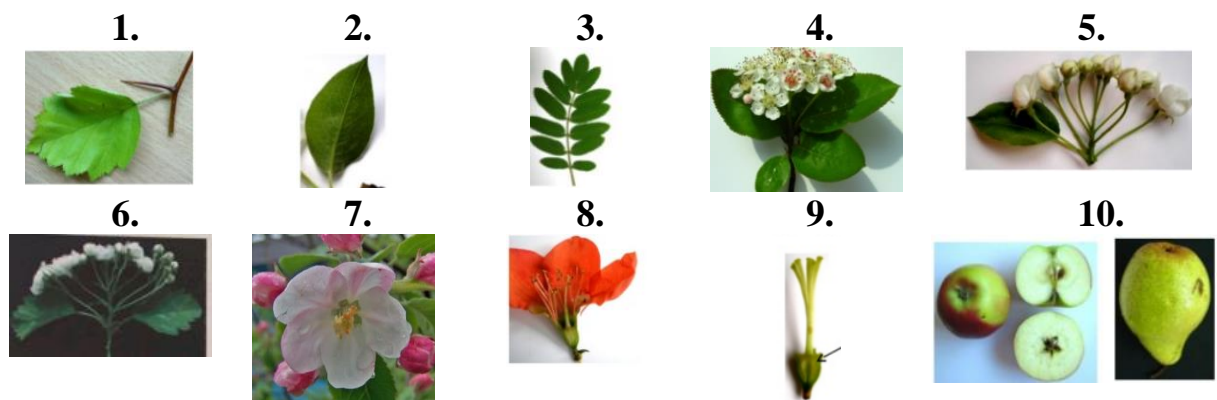
Rosoideae Subclass





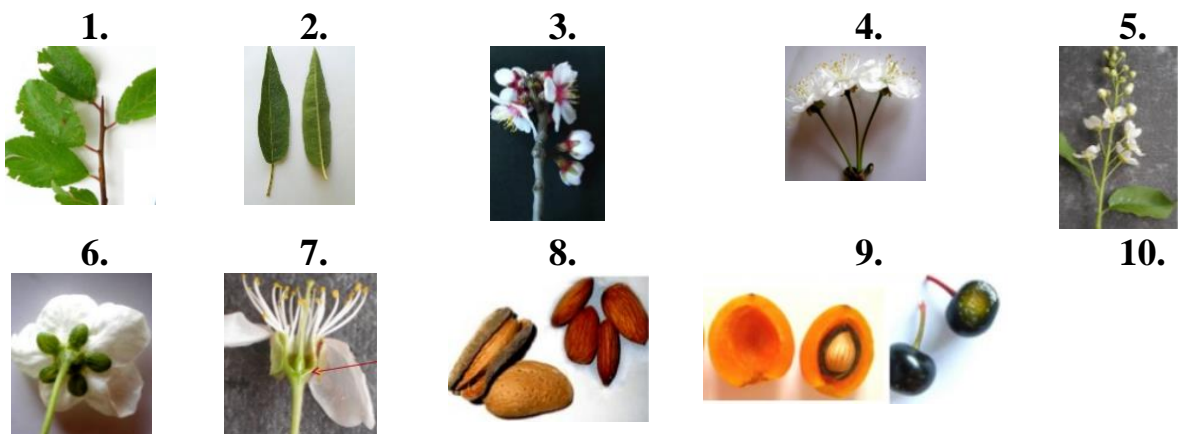
1 – rhizome; 2 – spikes; 3 – shoot; 4 – alternat arrangement leaves;
 5 – tricompond leaf; 6 – odd-pinnately compound leaf; 7 – head; 8 – raceme;
 9 – corymbose panicle; 10 – pentamerous double perianth; 11 – calyx with calyicle;
 12 – corolla with stamens and pistils; 13 – tetramerous perianth; 14 – concave
 receptacle; 15 – aggregate-accessory; 16 – polynutlet; 17 – phraga;
 18 – cynarodium; 19 – nut.

The Maloideae Subfamily



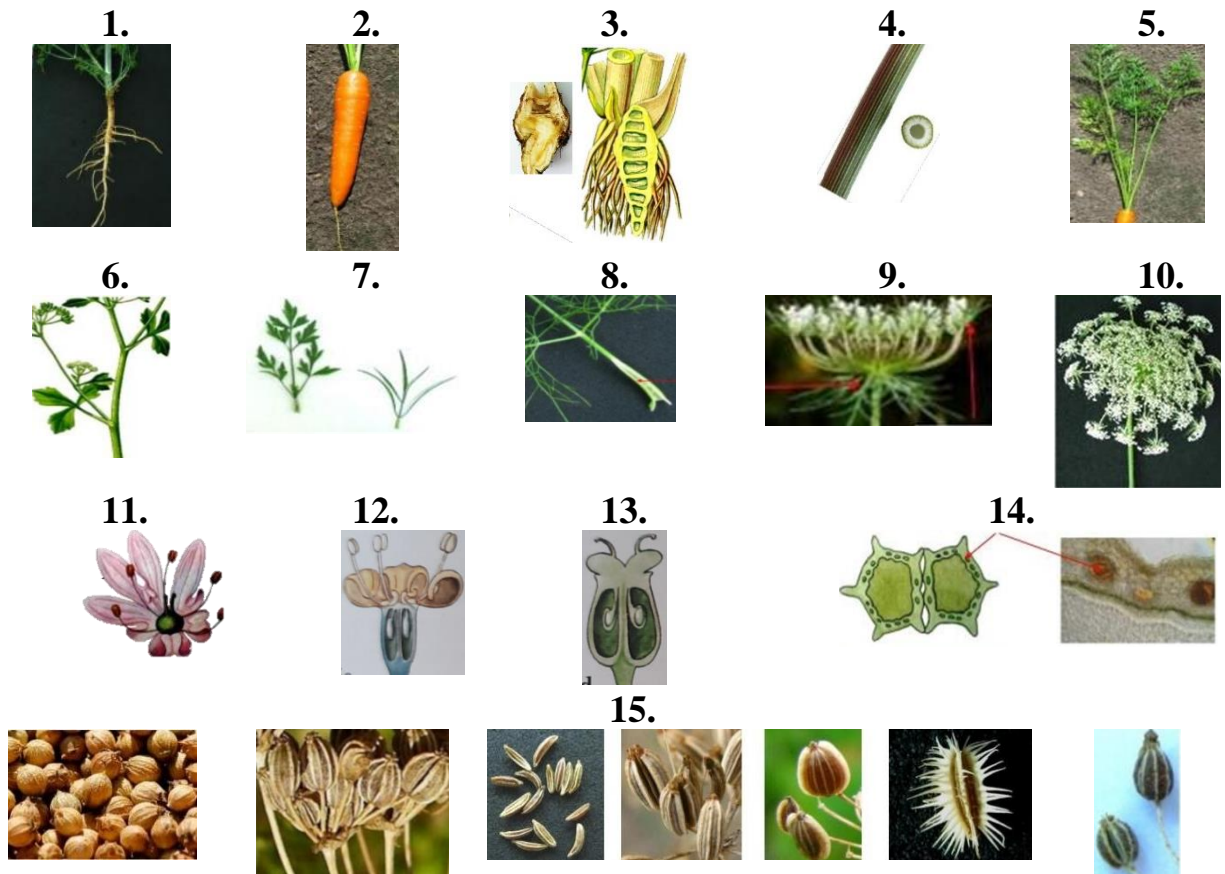
1 – thorn; 2 – simple leaf; 3 – odd-pinnately; 4 – umbel; 5 – corymb;
 6 – compound corymb; 7 – stellar corolla; 8 – inferior ovary position on the
 longitudinal section; 9 – cenocarpous gynoecium; 10 – pome.

The Prunoideae Subfamily



1 – apical thorn; 2 – simple leaf; 3 – axillary flowers; 4 – umbel; 5 – raceme;
 6 – double perianth; 7 – concave receptacle; 8 – dry drupes; 9 – fleshy drupes.

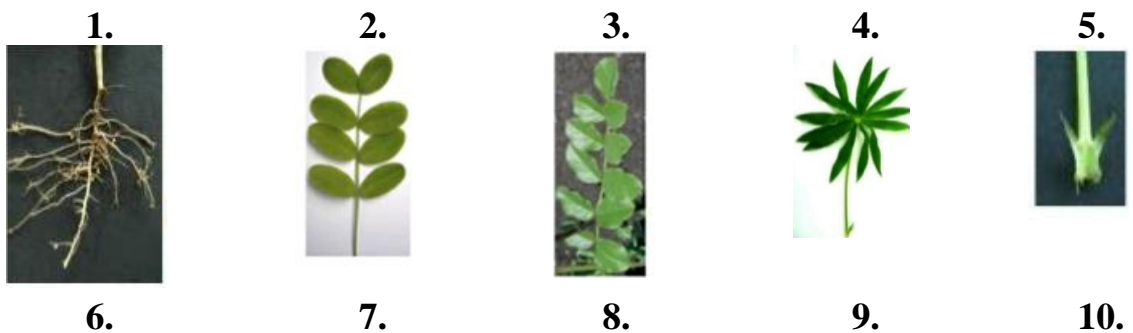
The Apiaceae Family

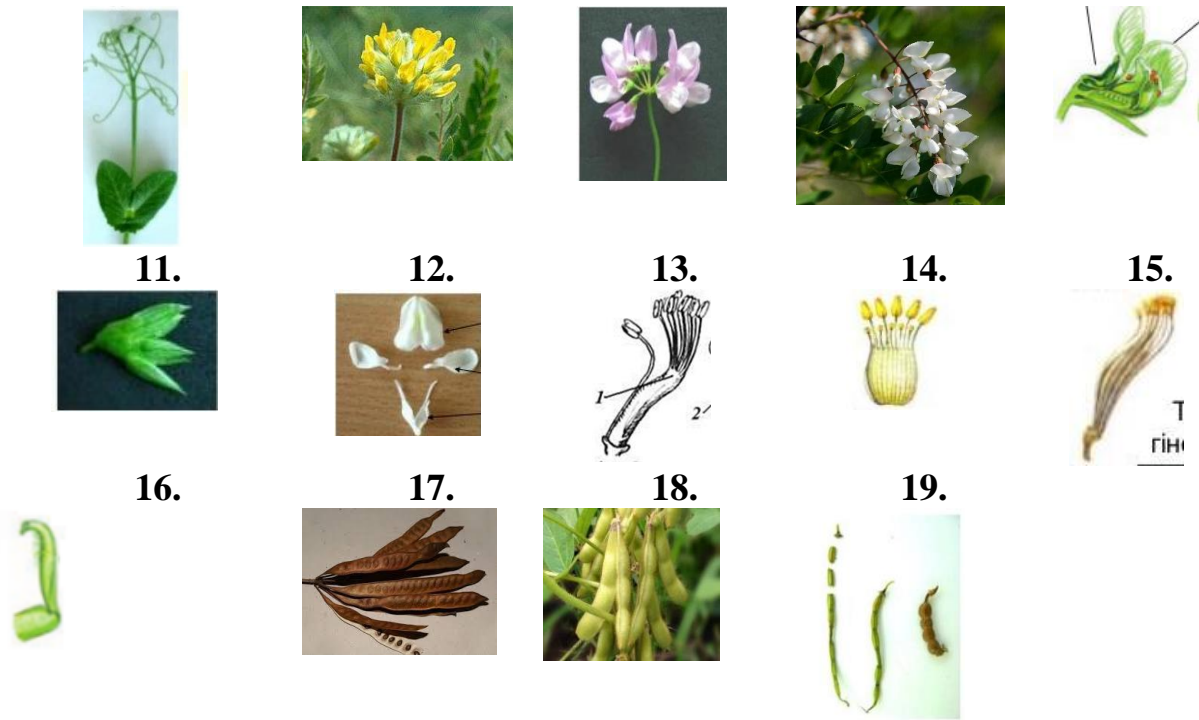


1 – tap root system; 2 – storage root; 3 – rhizome; 4 – costate and hollow stem; 5 – radical rosette; 6 – alternate stem leaves; 7 – heterophyllous; 8 – leaf sheath; 9 – compound umbel with involucre and involucel; 10 – plan view of flower; 11 – common view of flower; 12 – longitudinal section; 13 – cenocarpous gynoecium; 14 - gum conceptacles in the cremocarp; 15 – fruit – diversity of the cremocarps.

Rosoidae Subclass

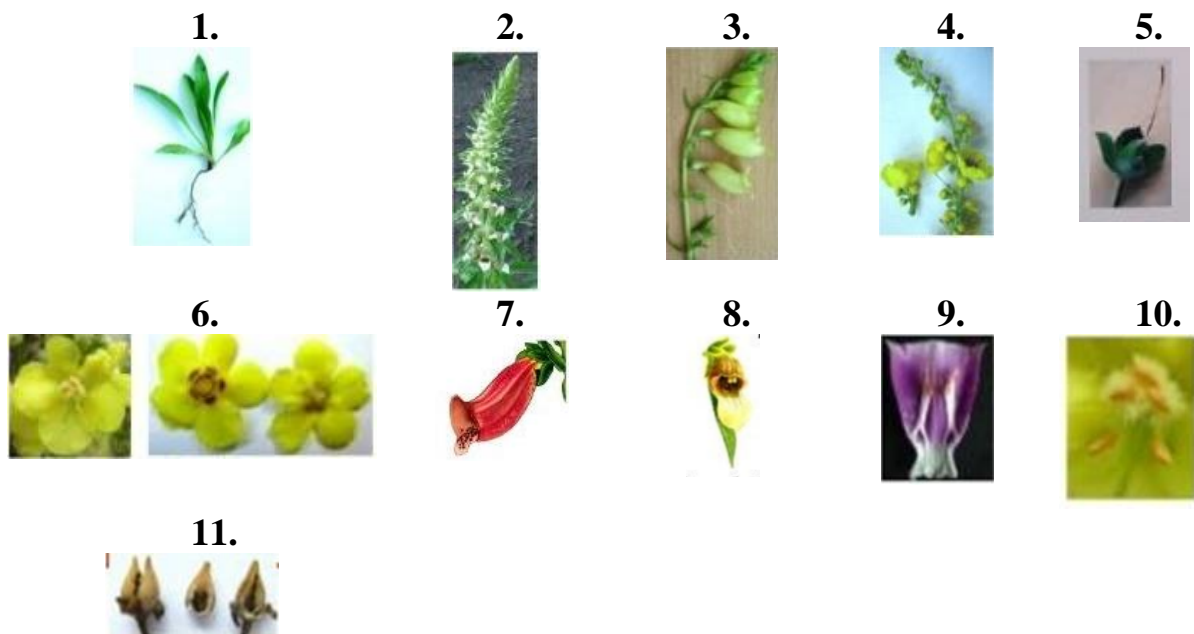
The Fabaceae Family





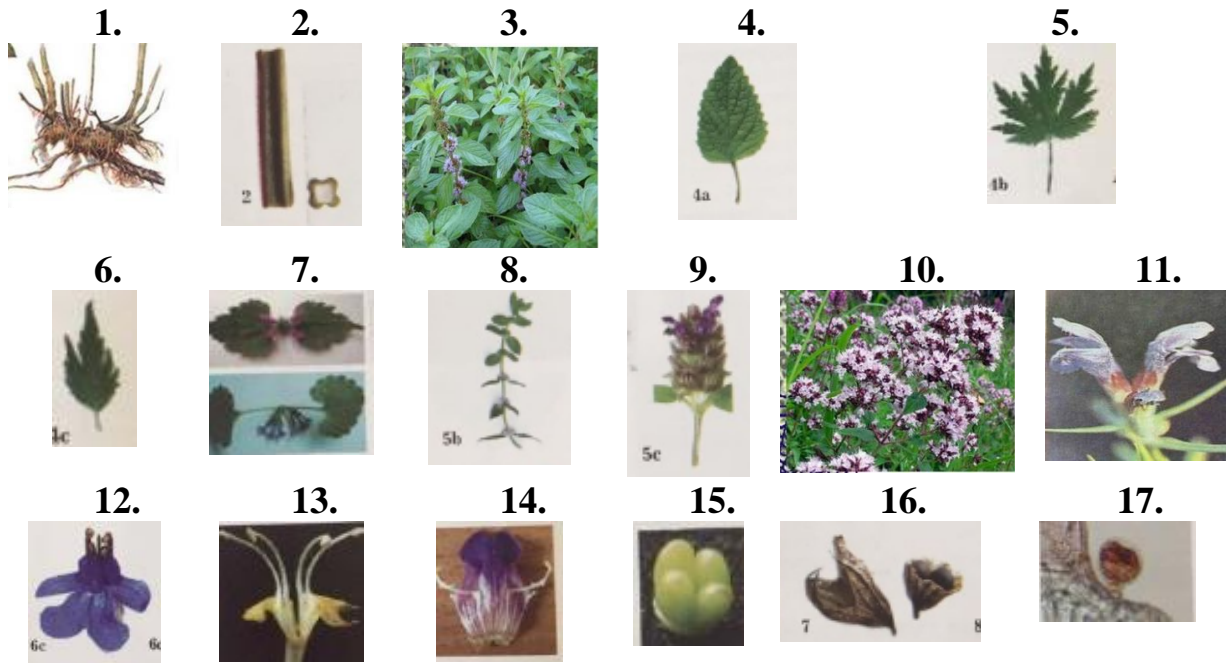
1 – tap root system with root nodules; 2 – paripinnate leaf; 3 – odd-pinnately compound leaf; 4 – palmately compound leaf; 5 – stipules modified into thorns; 6 – overgrown stipules and tendrils; 7 – head; 8 – umbel; 9 – raceme; 10 – double (papilionaceous) perianth flower; 11 – calyx; 12 – corolla; 13 – diadelphous androecium; 14 – monodelphous androecium; 15 – free stamens; 16 – pistil; 17 – dry legume; 18 – fleshy legume; 19 – loment legume.

The Scrophulariaceae Family



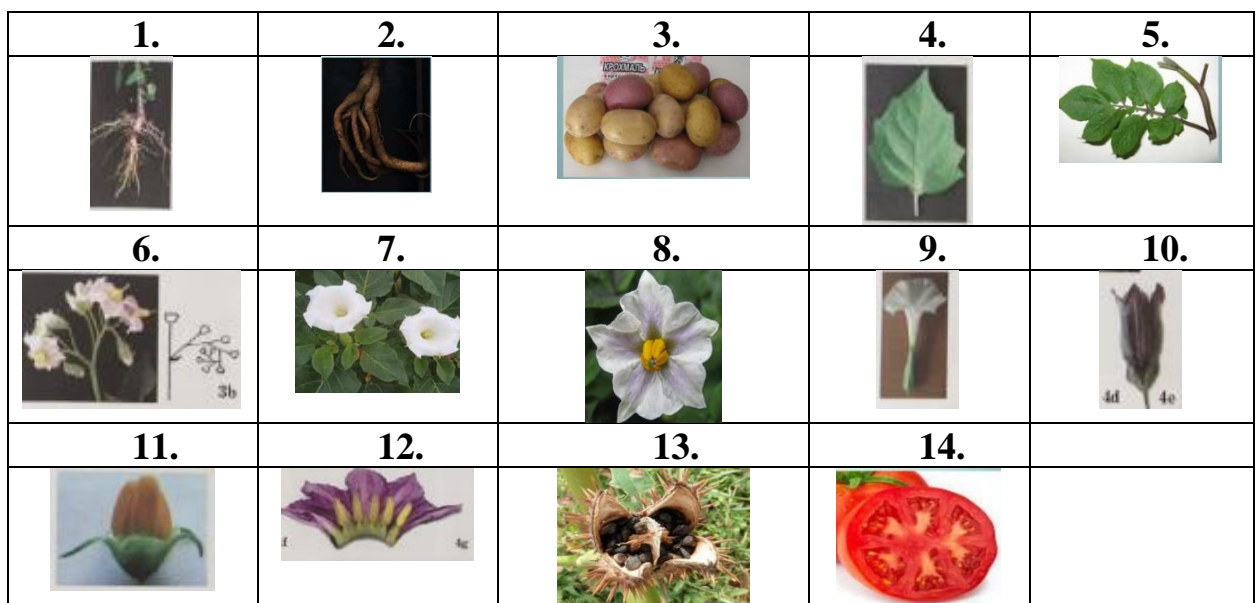
1 – radical rosette; 2 – raceme; 3 – unilateral raceme; 4 – thyrse; 5 – calyx; 6 – rotate corolla; 7 – thimble-shaped corolla; 8 – bilabiate corolla with spur; 9 – didymous androecium; 10 – free stamens; 11 – fruit capsule.

The Lamiaceae Family



1 – rhizome; 2 – tetraquetrous stem; 3 – crosswise opposite leaf position; 4 – entire leaf; 5 – palmatepartite leaf; 6 – trilobed leaf; 7 – whorls and false whorls; 8 – in-leaf angles; 9 – head; 10 – corymb-like panicle; 11 – bilabiate corolla; 12 – unilabiate corolla; 13 – didymous androecium; 14 – stamens with staminodes; 15 – ovary of the pistil; 16 – coenobium with the residuary calyx; 17 – chemosystematic features – essential glandule.

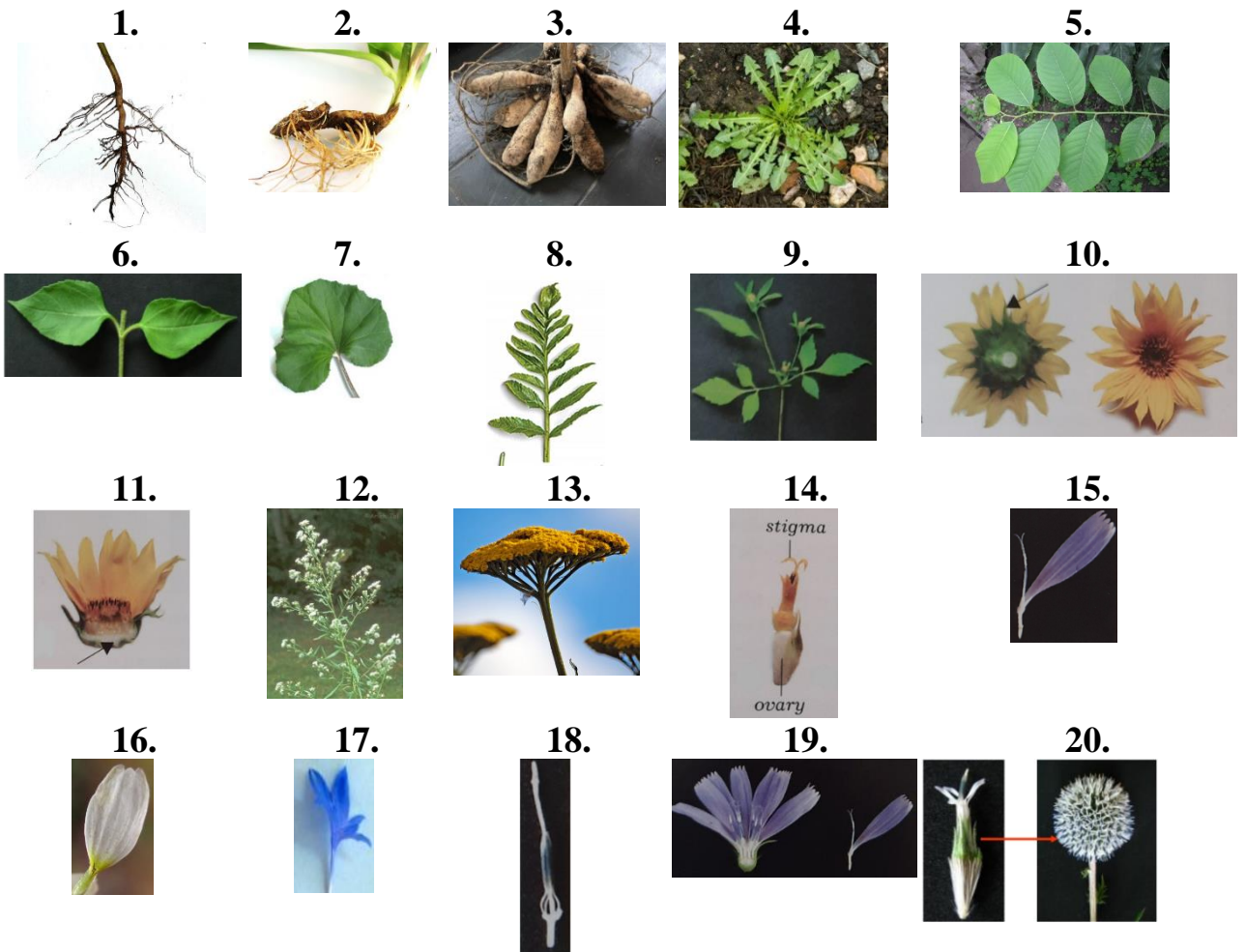
The Solanaceae Family



1 – tap root system; 2 – rhizome with roots; 3 – tuber; 4 – entire leaf; 5 – dissected leaf; 6 – bostryx; 7 – single terminal flower; 8 – rotate corolla; 9 – funnel-shaped corolla; 10 – bell-shaped corolla; 11 – stamens; 12 – synantherous androecium; 13 – capsule; 14 – berry.

Asteridae Subclass

The Asteraceae Family

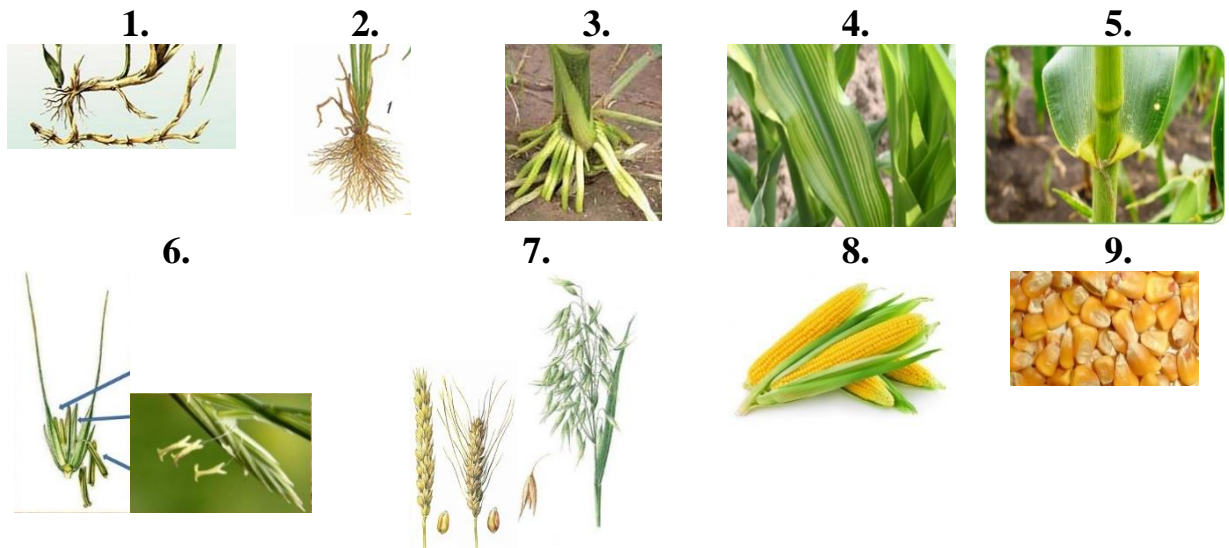


- 1 – tap root system; 2 – rhizome; 3 – tubers; 4 – basal rosette of leaves;
 5 – alternate leaf position; 6 – opposite leaf position; 7 – simple entire leaf;
 8 – simple dissected leaf; 9 – heterophyllous; 10 – involucre of the anthodium;
 11 – flat receptacle; 12 – panicle of the anthodiums; 13 – corymb-like of the
 anthodiums; 14 – tubular flower; 15 – ligulate; 16 – false-ligulate;
 17 – funnellform; 18 – synantherous androecium; 19 – ligulate flowers; 20 –
 tubular flowers.

Monocyledones (Liliopsida) Class

Liliadae Subclass

The Poaceae (or Gramineae) Family



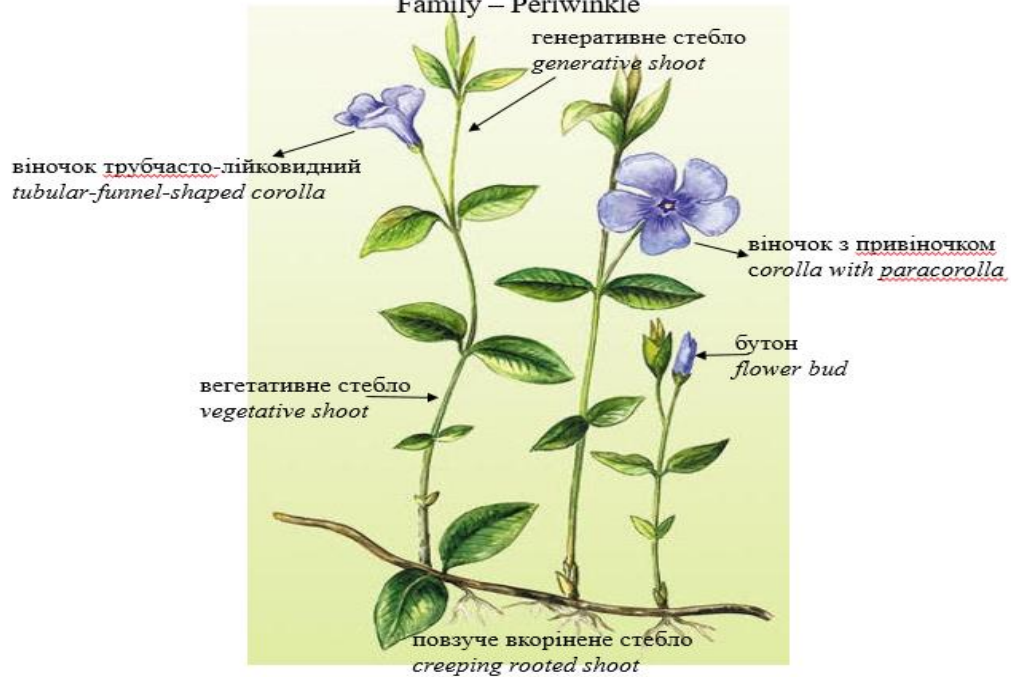
1 – rhizome; 2 – fibrous root system; 3 – prop roots; 4 – linear leaf, parallel venation; 5 – sheath; 6 – compound spike; 7 – panicle of the spike; 8 – spadix; 9 – caryopsis.

II. DESCRIPTION EXAMPLES OF OF HERBAL SAMPLES OF MEDICINAL PLANTS

Species – Vinca minor – Lesser periwinkle

Familia – Apocynaceae

Family – Periwinkle

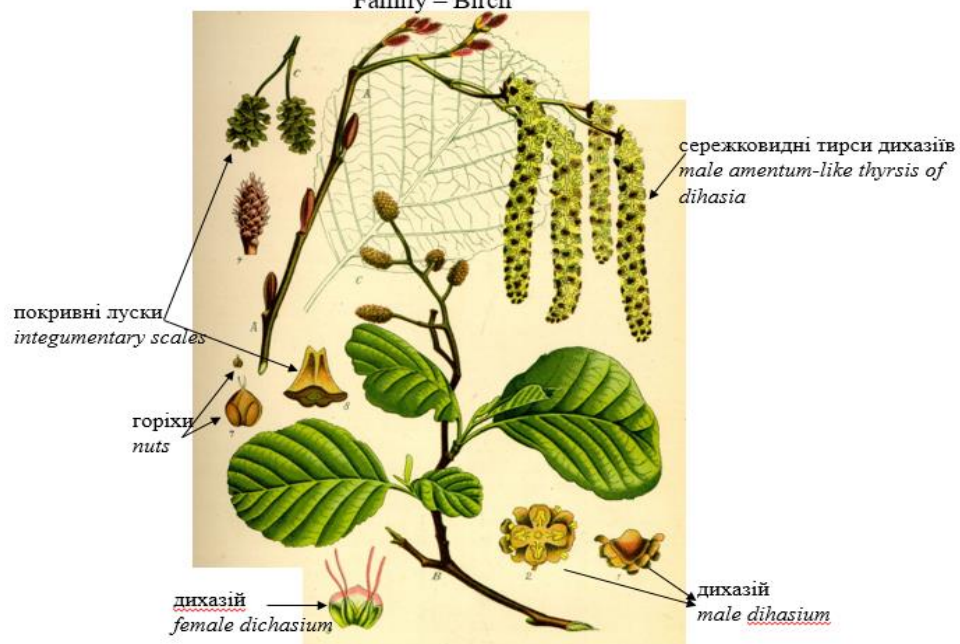


Evergreen wild or cultivated subshrub or herb, up to 0,6 m high,
Herb: hypotensive, antiarrhythmic, antiedemic, sedative.

Species – Alnus glutinosa – alder or Europaen black alder

Familia – Betulaceae

Family – Birch



Monoecious deciduous wild tree or bush up to 20,0 m high.
Multiple fruits 'strobiles': astringent, hemostatic, anti-inflammatory.

Species – Urtica dioica – common nettle or greater nettle

Familia – Urticaceae

Family – Nettle

квітка з чашечковидною оцвітиною
male flower with calyciform perianth



волотисті тирси
panicle-like thyrsi

жалкі емергенці
emergences – stinging hairs

квітка з чашечковидною оцвітиною
female flower with calyciform perianth

Perennial dioecious wild herb, up to 2.0 m high.

Leaves: vitaminous, hemostatic, diuretic, general strengthening.

Species – Althaea officinalis – Marsh mallow

Familia – Malvaceae

Family – Mallow

пазушні квітки
axillary flowers

лістя цілісне або лопатеве
entire or lobed leaves

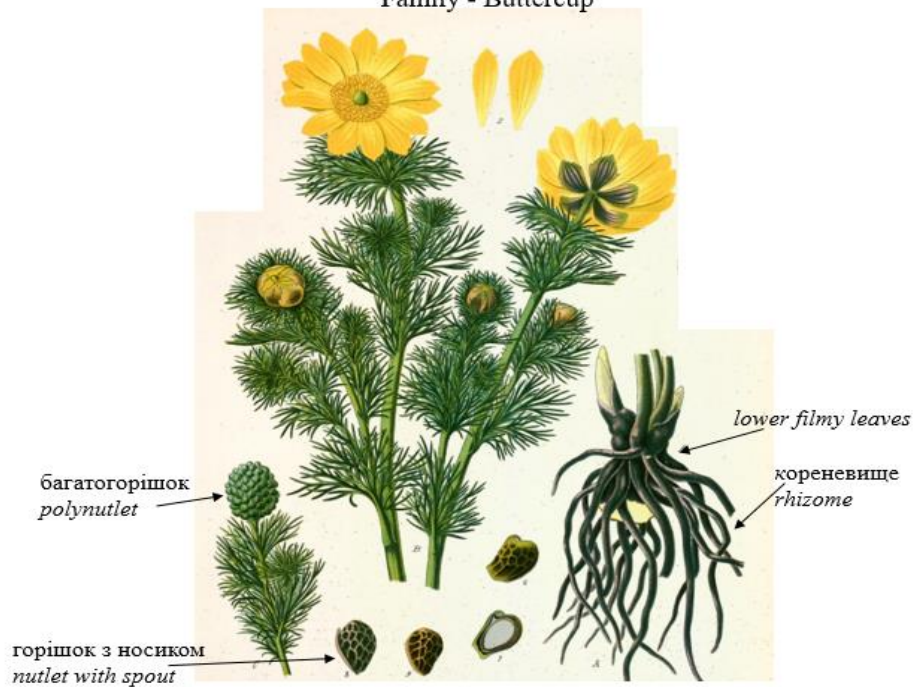
кореневище з коренями



Perennial cultivated herb, up to 1,5 m high.

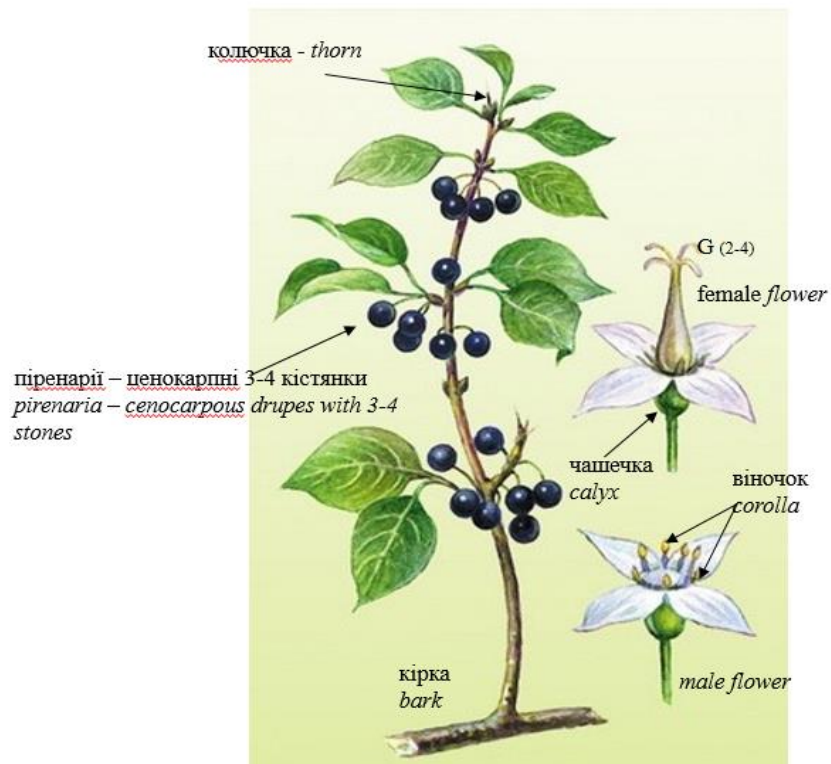
Roots, leaves: expectorant, emollient, coating.

Species – *Adonis vernalis* – spring Adonis
 Familia – Ranunculaceae
 Family - Buttercup



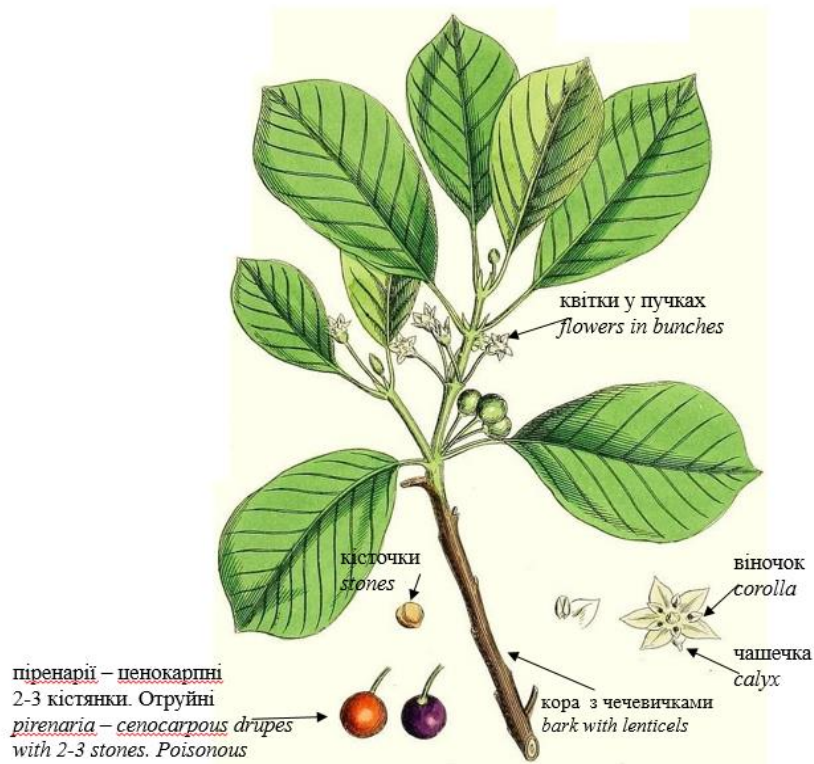
Perennial wild herb, up to 0,3 m high.
 Herb: cardiotonic, sedative, hepatensive, antiarrhythmic.

Species – *Rhamnus cathartica* - buckthorn
 Familia – Rhamnaceae
 Family - Buckthorn



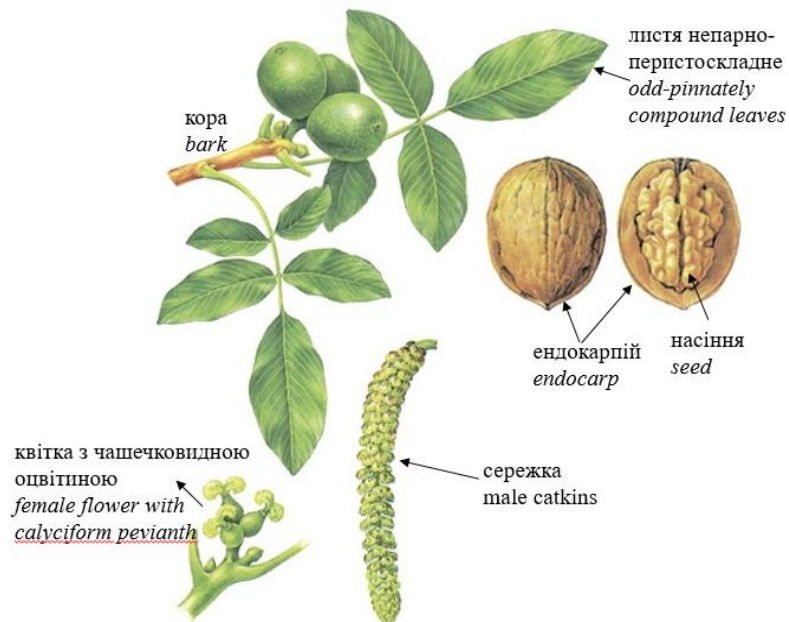
Dioecious weed deciduous bush or tree, up to 3.0 m high.
 Fruits: laxative, antibacterial.

Species - Rhamnus frangula – Alder buckthorn
 Familia - Rhamnaceae
 Family – Buckthorn



Dioecious weed deciduous bush or tree, up to 3.0 m high.
 Bark: laxative.

Species – Juglans regia – Common walnut
 Familia – Juglandaceae
 Family – Walnut

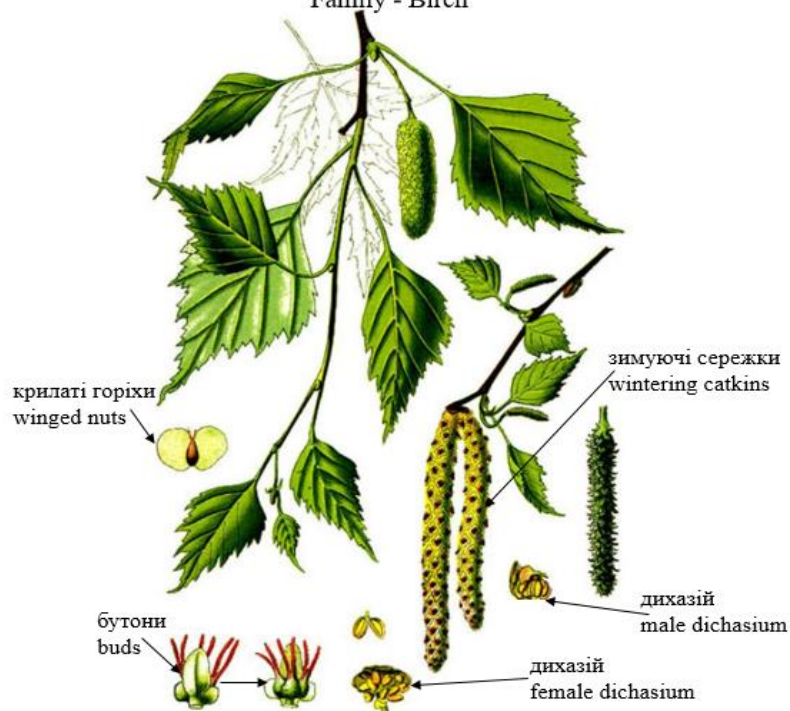


Cultivated, deciduous monoecious tree, up to 30,0 m high.
 Leaves: astringent, antibacterial, antiviral.
 Seeds: source off fatty oil, antisclerotic, general streghening.

Species – *Betula pendula*, *B. verrucosa* – common birch or white birch.

Familia – Betulaceae

Family - Birch



Monoecious deciduous wild tree, up to 20,0 m high.

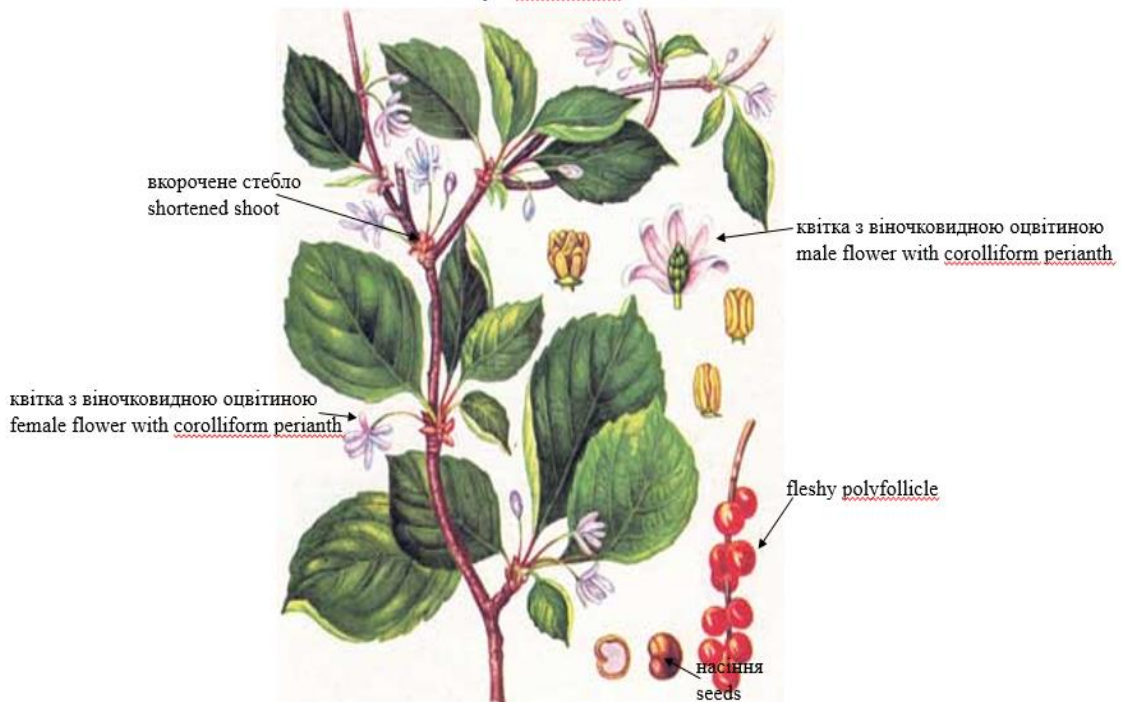
Leaves, buds: cholagogue, diuretic, diaphoretic.

Juice: metabolic, antihelminthic, stimulating.

Species – *Schizandra chinensis* – Chinese magnolia vine or *schizandra*

Familia – Schizandraceae

Family - Schizandra



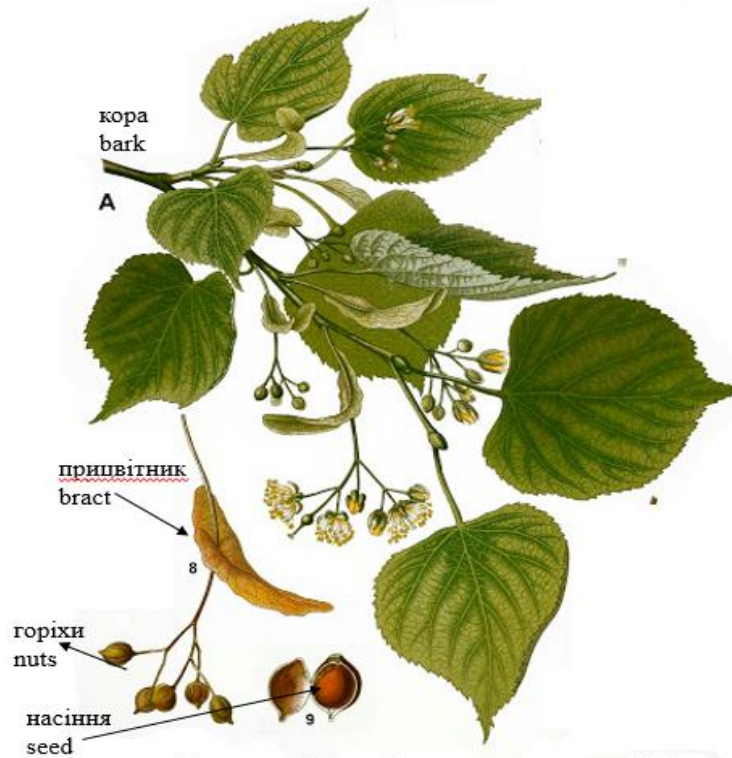
Woody vine, dicious or monoecious, cultivated, up to 10,0 m high.

Fruits, seeds: vitaminous, tonic, exciting.

Species – Tilia cordata – little-leaf linden

Familia – Tiliaceae

Family - Linden



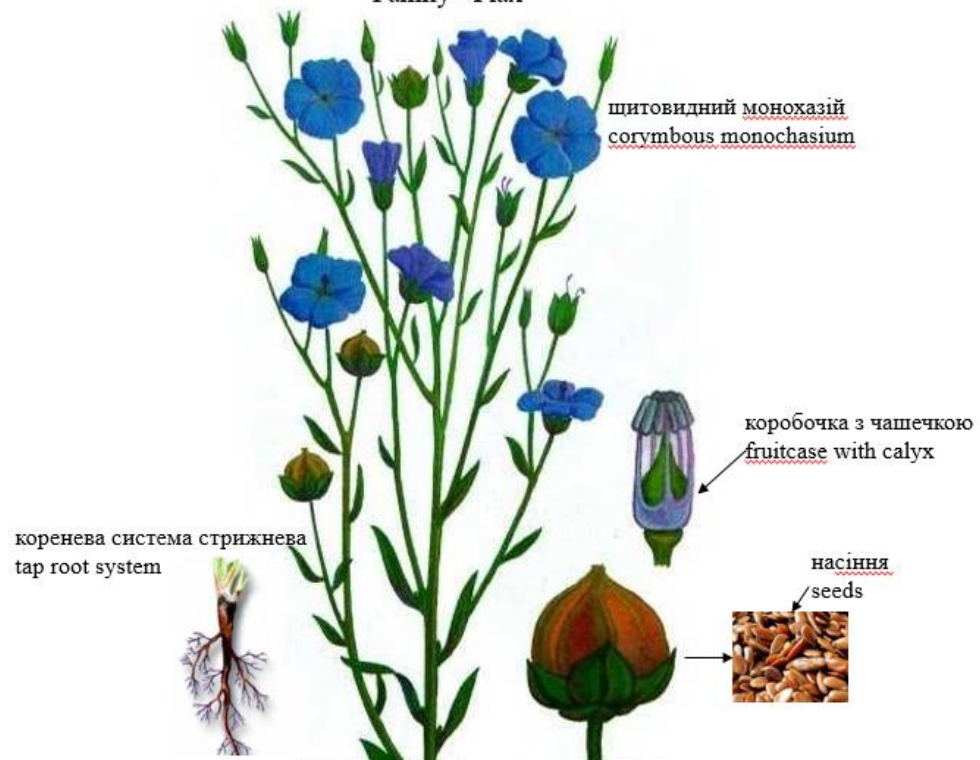
Deciduous cultivated tree, up to 25.0 m high.

Flowers, leaves – vitaminous, antipyretic, antibacterial.

Species – Linum usitatissimum – common flax

Familia – Linaceae

Family - Flax



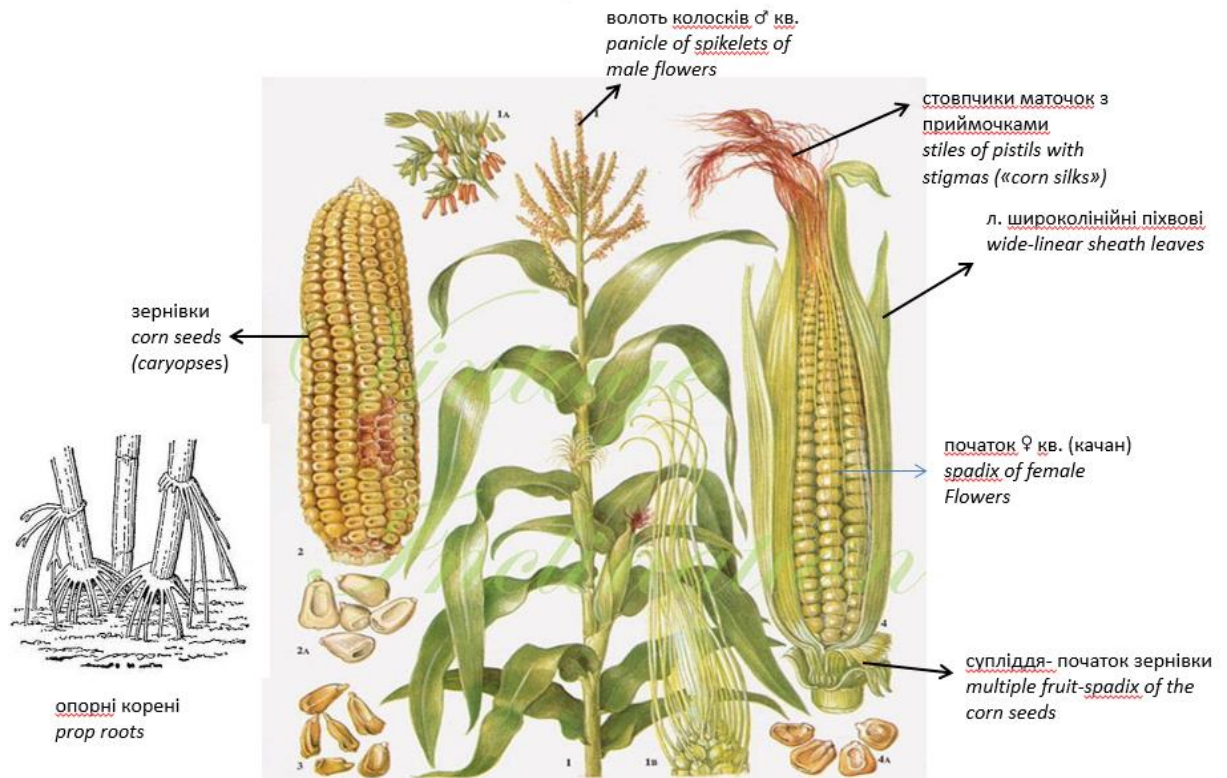
Annual cultivated herb, up to 1.2 m high.

Seeds: laxative, vitaminous, coating.

Species - Zea mays - Corn or maize

Familia - Poaceae (Gramineae)

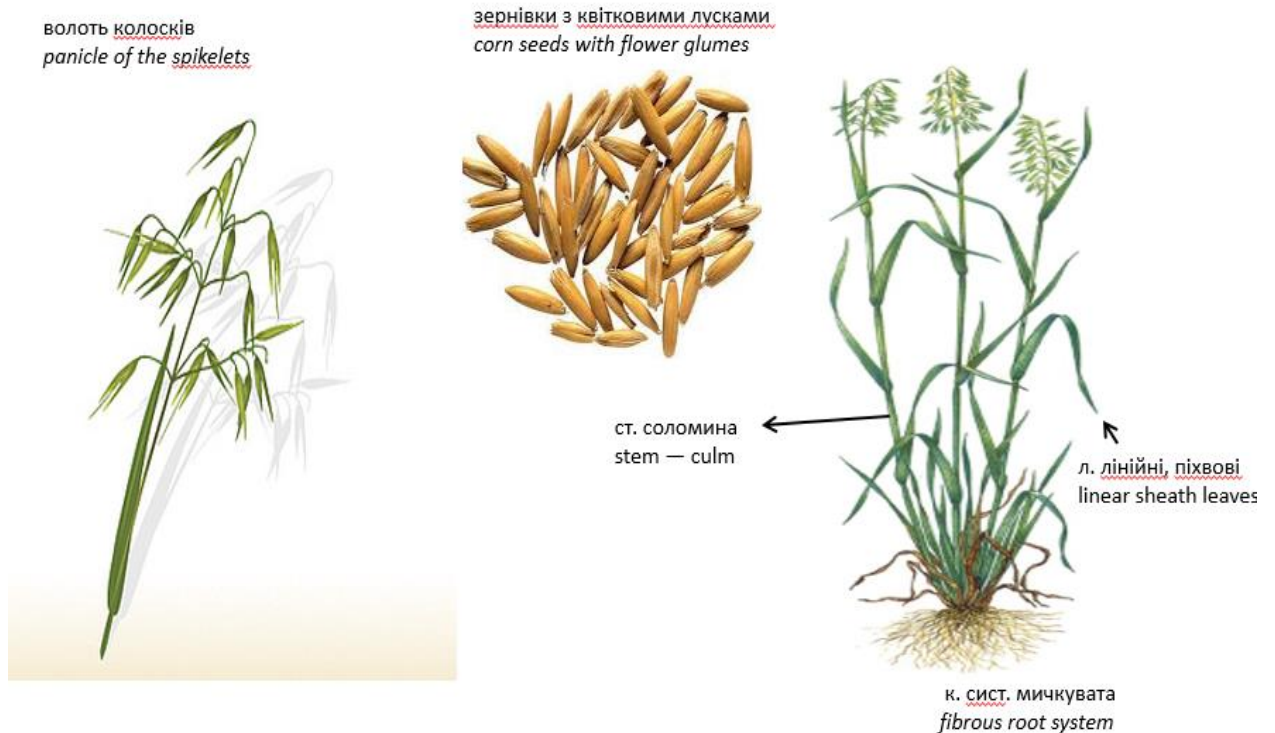
Family - Grass



Species - Avena sativa L. - Oat

Familia - Poaceae (Gramineae)

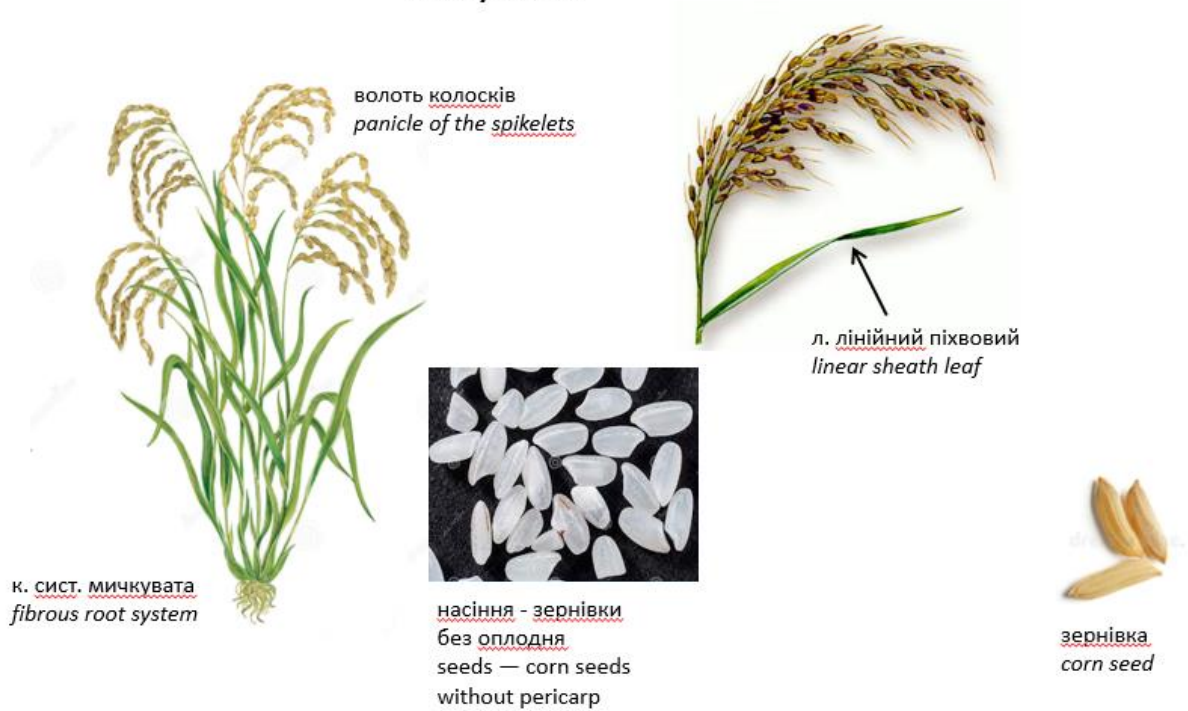
Family - Grass



Species - *Oryza sativa* L. - rice

Familia - Poaceae (Gramineae)

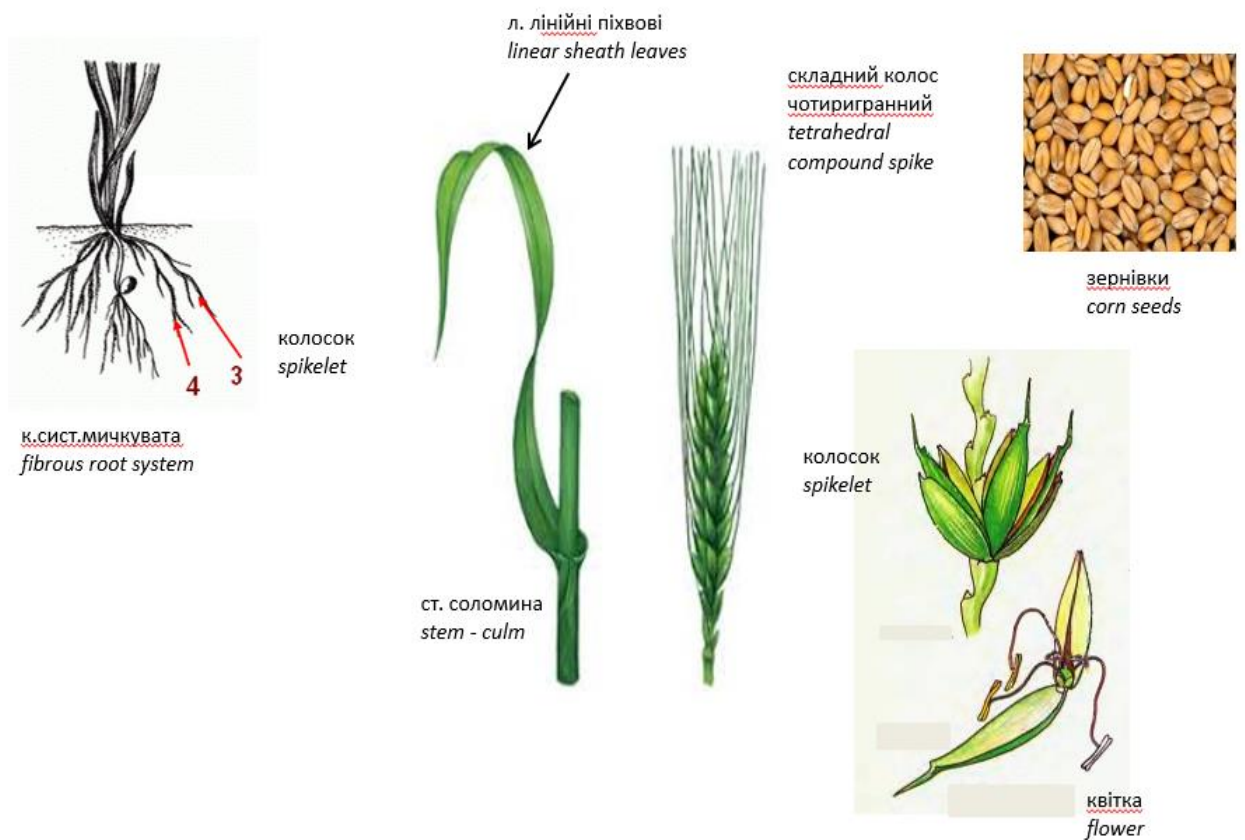
Family - Grass



Species - *Triticum aestivum* L. - soft wheat

Familia - Poaceae (Gramineae)

Family - Grass



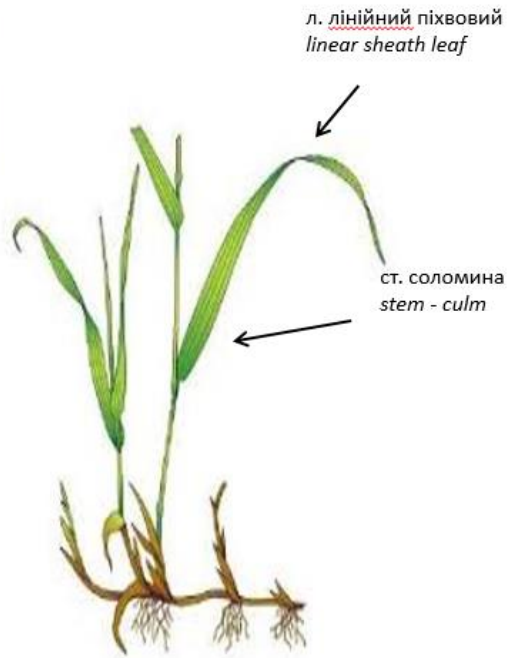
Species - Elytrigia repens(L.) Nevski., Agropyron repens L. -
quitch, couch grass or dog's grass

Familia - Poaceae (Gramineae)

Family - Grass



кореневище - rhizome



л. лінійний піхвовий
linear sheath leaf

ст. соломина
stem - culm



складний колос
compound spike



зернівки
corn seeds

TESTS

KROK-1. "PHARMACY". BOTANY. 2017.

1. Within folded parenchyma of a fir needle, there are cavernous structures filled with galipot and lined with live thin-walled secretory cells. Name these structures...

A. Resin ducts

B. Laticifers

C. Hydatodes

D. Glandules

E. Nectar glands

2. Stem thickening occurs due to the functioning of the following structures...

A. Lateral meristem

B. Apical meristem

C. Wound meristem

D. Intercalary meristem

E. Endoderm

3. During the identification of fruits of the Datura family they were determined to be a...

A. Thorned quadrivalve capsule

B. Glossy blackberry

C. Urceolate capsule with a lid

D. Juicy globular cynarodium

E. Berry in an orange cup

4. Species character of *Thymus serpyllum* includes apical inflorescences (flower heads), dark punctate glands on the inferior surface of a leaf, long hairs along the edge of leaf base, and...

A. Creeping stems

B. Thorns

C. Stems with prickles

D. Climbing stems

E. Short decumbent stems

6. What inflorescences are characteristic of the Cruciferae (Brassicaceae) family?

A. Raceme or panicle

- B. Capitulum or corymb
- C. Capitulum or umbel
- D. Corymb or spike
- E. Spadix or panicle

7. You are studying a silvery downy plant of the Asteraceae family, which is rich with essential oils and bitters. Harvested are apical sprouts with a panicle of small round flower heads. This plant is...

A. Artemisia absinthium

- B. Arctium lappa
- C. Bidens tripartita
- D. Calendula officinalis
- E. Chamomilla recutita

8. Colored or white component of double perianth, which consists of petals, is a...

A. Corolla

- B. Flower cup
- C. Androecium
- D. Gynoecium
- E. Perigonium

9. Actinomorphic apopetalous corolla include...

A. Cruciform

- B. Funnelform
- C. Campanulate
- D. Tubular
- E. Ligulate

10. A plant producing essential oil has square stem, bilabiate corolla, coenobium fruit. These features are characteristic of...

A. Lamiaceae

- B. Papaveraceae
- C. Polygonaceae
- D. Solanaceae
- E. Scrophulariaceae

11. A plant under investigation has compound uniform monopodium inflorescence – compound umbel. What plant is it characteristic of?

A. Anethum graveolens

- B. *Allium cepa*
- C. *Sorbus aucuparia*
- D. *Rosa canina*
- E. *Centaurea cyanus*

12. During field practice a student was tasked with making a morphological collection of coenocarpous fruits. What type of fruit belongs to this group?

A. Hesperidium

- B. Aggregate-accessory fruit
- C. *Fragaria*
- D. *Cynarodium*
- E. Drupe

13. Connection between plant cell protoplasts and their metabolic function is provided by thin cytoplasmic threads that pass through pores in the cell walls. Name these threads...

A. Plasmodesma

- B. Fibrils
- C. Microtubules
- D. Microfilaments
- E. Cytoskeleton

14. Both scientific and folk medicine uses the medicinal plant *Glycyrrhiza glabra* L. What part of the plant is harvested?

A. Roots and rhizomes

- B. Foliage
- C. Inflorescence
- D. Grass
- E. Seeds

15. Rhizome of an Asteraceae family species is polycephalous, succulent, has lysigenous cavities, accumulates inulin. Such underground organ is characteristic of...

A. *Inula helenium*

- B. *Hyoscyamus niger*
- C. *Digitalis grandiflora*
- D. *Sorbus aucuparia*
- E. *Helianthus annuus*

16. Bark of a thornless xylophyte of the Rhamnaceae family has the laxative effect. Name this plant...

- A. Frangula alnus**
- B. Aronia melanocarpa
- C. Hippophaë rhamnoides
- D. Rubus idaeus
- E. Crataegus sanguinea

17. A perennial plant has white flower heads grouped in compound corymbs and bipinnatisected or tripinnatisected leaves. Name this plant...

- A. Achillea millefolium**
- B. Melilotus officinalis
- C. Potentilla erecta
- D. Phaseolus vulgaris
- E. Taraxacum officinale

18. Seeds of rye, corn, and other crops have small corymb-shaped cotyledon and accumulate nutrients in the...

- A. Endosperm**
- B. Perisperm
- C. Shell
- D. Gemmule
- E. Embryo root

19. Name the process of cell membrane saturation with a fat-like substance – suberin...

- A. Suberization**
- B. Lignification
- C. Mineralisation
- D. Cutinization
- E. Sliming

20. The fruit is a thorned many-seeded capsule that opens into four flaps when ripe. It is characteristic of...

- A. Datura stramonium**
- B. Papaver somniferum
- C. Hyoscyamus niger
- D. Digitalis purpurea
- E. Linum usitatissimum

KROK-1 "PHARMACY". BOTANY. 2018.

1. It is known that in plants the synthesis of secondary reserve starch occurs in

- A. Amyloplasts**
- B. Chloroplasts
- C. Chromoplasts
- D. Elaioplasts
- E. Proteinoplasts

2. What type of conducting bundle is characteristic of the primary anatomical structure of a root?

- A. Radial**
- B. Concentric
- C. Closed collateral
- D. Bicollateral
- E. Open collateral

3. A dissected flower has numerous stamens that are united by the stamen filaments into several bundles. What is this type of androecium?

- A. Polyadelphous**
- B. Monadelphous
- C. Diadelphous
- D. Didynamous
- E. Tetradynamous

4. A food plant of the Polygonaceae family is being studied. The plant has a reddish stalk, cordate-sagittate leaves, its fruit is a trihedral nutlet. Name this plant.

- A. Fagopyrum esculentum**
- B. Polygonum bistorta
- C. Polygonum hydropiper
- D. Polygonum aviculare
- E. Rumex confertus

5. Microscopy of subterranean organs of the Asteraceae family plant shows articulated laticifers with anastomoses filled with white latex. It is characteristic of the following plant

- A. Taraxacum officinale**
- B. Helianthus annuus
- C. Artemisia absinthium

- D. *Bidens tripartita*
- E. *Achillea millefolium*

6. A sample section of an axial body shows a complex consisting of phellogen and its derivatives – cork and phelloderm. Name this tissue.

A. Periderm

- B. Collenchyma
- C. Sclerenchyma
- D. Epiblema
- E. Epidermis

7. Racemose clusters of calcium carbonate crystals are detected among the waste products of a protoplast. These crystals are

A. Cystoliths

- B. Isolated crystals
- C. Raphides
- D. Styloid crystals
- E. Crystal druses

8. A fruit tree of the Rosaceae family has short thorny shoots; the fruit is a distinctively shaped pome with stone cells in its pulp. Name this plant.

A. *Pyrus communis*

- B. *Malus sylvestris*
- C. *Cerasus vulgaris*
- D. *Prunus armeniaca*
- E. *Prunus spinosa*

9. Morphologically the herbaceous plant being studied can be identified as *Convallaria majalis*. To confirm this conclusion additionally, a leaf of this plant was examined under the microscope and a search for the following crystalline inclusions was conducted:

A. Raphides

- B. Single crystals
- C. Druse crystals
- D. Styloid crystals
- E. Crystal sand

10. *Calendula officinalis* as a representative of the Asteraceae family can be characterized by the following type of inflorescence:

A. Anthodium

- B. Umbel
- C. Catkin
- D. Capitulum
- E. Corymb

11. Herbarium specimens of medicinal plants are being studied. Which one of them belongs to the Rosaceae family?

A. Crataegus sanguinea

- B. Melilotus officinalis
- C. Conium maculatum
- D. Capsella bursa-pastoris
- E. Polygonum persicaria

12. A certain herbaceous plant grows on the meadows of the Carpathian Mountains. It has orange anthodium inflorescences, an upright stem, and a rosette of basal leaves. Name this plant.

A. Arnica montana

- B. Cychorium intybus
- C. Calendula officinalis
- D. Echinacea purpurea
- E. Centaurea cyanus

13. You are studying a silvery downy plant of the Asteraceae family, which is rich in essential oils and bitters. Harvested are the apical sprouts with a panicle of small round flower heads. This plant is

A. Artemisia absinthium

- B. Arctium lappa
- C. Bidens tripartita
- D. Calendula officinalis
- E. Chamomilla recutita

14. Upon examination of a flower it is determined to have one pistil made up of a single free carpel. Therefore, this gynoecium can be identified as:

A. Monocarpous

- B. Apocarpous
- C. Lysicarpous
- D. Paracarpous
- E. Syncarpous

15. Students should identify the following to determine the sex of a flower:

- A. Stamens and pistils**
- B. Flower cup and corolla
- C. Pedicle and receptacle
- D. Symmetry
- E. Color and type of indumentum

16. In spring a perennial plant of the Asteraceae family produces floral shoots with golden-yellow flowers. After blossom fall, shoots with large leaves appear. Name this plant.

- A. Tussilago farfara**
- B. Hypericum perforatum
- C. Potentilla erecta
- D. Petroselinum crispum
- E. Datura stramonium

17. A fruit is a capsule with oblate light brown smooth glossy seeds that mucify when moistened. This fruit belongs to:

- A. Linum usitatissimum**
- B. Hypericum perforatum
- C. Ledum palustre
- D. Linaria vulgaris
- E. Digitalis purpurea

18. Rhizome of the Asteraceae family species is polycephalous, succulent, has lysigenous cavities, accumulates inulin. Such underground organ is characteristic of:

- A. Inula helenium**
- B. Hyoscyamus niger
- C. Digitalis grandiflora
- D. Sorbus aucuparia
- E. Helianthus annuus

19. Some medicinal plants are poisonous. Select a poisonous plant from the list below:

- A. Digitalis purpurea**
- B. Origanum vulgare
- C. Thymus serpyllum
- D. Salvia officinalis

E. *Thymus vulgaris*

20. A certain dioecious plant commonly grows at the forest edge. It is a shrub with thorned sprouts. Its fruit is a round black coenocarpous drupe (pyrenarium) with 3-4 seeds. Name this plant.

A. *Rhamnus cathartica*

B. *Hippophae rhamnoides*

C. *Crataegus sanguinea*

D. *Rosa canina*

E. *Sambucus nigra*

21. Name the process of cell membrane saturation with a fat-like substance - suberin:

A. Suberization

B. Lignification

C. Mineralization

D. Cutinization

E. Mucification

KROK-1. "PHARMACY". BOTANY. 2019.

1. The student is studying a plant organ with radial symmetry, unlimited growth, and positive geotropism. It provides nourishment, vegetative reproduction, and plant fastening in the soil. Which of the following is described?

A. Root

B. Stem

C. Seed

D. Leaf

E. Rhizome

2. Each root site performs a certain function due to the special cells that form tissues. Zones allow growing in the earth, sucking substances out of the soil and carrying them to all other plant parts. Which of the following types of conducting beams are inherent in all root zones of single-seeded plants?

A. Radical

B. Bilateral

C. Central xylem (Amphicribal)

D. Central phloem (Amphivasal)

E. Collateral

3. Common nettle, common hops, black elderberry belong to a group of plants, which require a large amount of nitrogen in the soil to ensure their normal growth. What is the name of this group of plants?

- A. Calciphobes
- B. Calciphiles
- C. Halophytes
- D. Nitrophytes**
- E. Nitrophobes

KROK-1. "PHARMACY". BOTANY. 2020.

1. The fruit is a bright-red juicy follicetum with a sweet-sour taste. The seeds are kidney-shaped and smell similar to lemon. Such fruits belong to.

- A. *Sorbus aucuparia*
- B. *Citrus limon*
- C. *Malus domestica*
- D. *Schisandra chinensis***
- E. *Viburnum opulus*

2. Each root zone performs a certain function due to the special cells that form tissues. The root zones allow the plants to grow in the soil, absorbing substances from it and carrying them to all the other plant parts. What type of vascular bundles is characteristic of all root zones of single-seed plants?

- A. perixylematic (amphivasal)
- B. collateral
- C. periphloematic (amphicribal)
- D. radial**
- E. bicollateral

3. The study object is an undeveloped or embryonic shoot which normally occurs at the tip of a stem or in the axil of a leaf. It has growing point and germinal leaves. Which of the following is described?

- A. bud**
- B. root apex
- C. bulb
- D. bulbotuber
- E. lenticel

***Bud** is an immature shoot; an undeveloped shoot covered with protecting scales. Consisting of a very short axis bearing primordia of leaves or flower parts.

THE BRASSICACEAE FAMILY

1. Plants which have flowers with cruciform calyx and corolla, tetradymous androecium and fruits – silique and silicic, are typical for family...

A. Solanaceae (Potato)

B. Brassicaceae (Mustard)

C. Fabaceae (Legume)

D. Apiaceae (Carrot)

E. Scrophulariaceae (Figwort)

2. The morphological comparison of the plants of the Brassicaceae (Mustard) Family shows that most of the representatives have small flowers gathered in inflorescences – ...

A. glom, anthodium

B. corymb, umbel

C. raceme, panicle

D. spadix, spike

E. compound umbel

3. Seeds of the Brassicaceae (Mustard) Family plants have poignant taste and used for the production of the mustard plasters and fatty oil. These seeds are taken from such plants as ...

A. Brassica nigra (black mustard), Capsella bursa-pastoris (shepherds purse) and Sinapis alba (white mustard)

B. Brassica oleracea (cabbage). Brassica nigra (black mustard) and Brassica juncea (chinese mustard)

C. Capsella bursa-pastoris (shepherds purse), Sinapis alba (white mustard) and Brassica juncea (chinese mustard)

D. Brassica nigra (black mustard), Sinapis alba (white mustard) and Brassica juncea (Chinese mustard)

E. Erysimum canescens (treacle mustard) Brassica nigra (black mustard) and Brassica juncea (chinese mustard)

4. By comparison of five medicinal plants, it is determined that one of them belongs to the Brassicaceae (Mustard) Family, namely ...

A. Polygonum aviculare (knot grass)

B. Rosa canina (dog rose)

C. Arctostaphylos uva-ursi (bearberry)

D. Urtica dioica (great nettle)

E. *Erysimum canescens* (erysimum)

5. Among the samples of the plants we determine the species that belongs to the Mustard (*Brassicaceae*) Family. This is ...

- A. *Taraxacum officinale* (dandelion)
- B. *Ledum palustre* (march tea)
- C. *Salvia officinalis* (garden sage)
- D. *Erysimum canescens* (treacle mustard)**
- E. *Calendula officinalis* (pot marigold)

6. *Capsella bursa-pastoris* (shepherd s purse) is an annual plant, which has ...

- A. pinnatisected and pinnatipartite leaves and triangular siliques**
- B. entire leaves and roundish siliques
- C. pinnatilobate leaves and cylindrical siliques
- D. pinnately compound leaves and loment siliques
- E. pinnatipartite leaves and cylindrical siliques

THE PAPAVERACEAE FAMILY

1. The determinated medicinal plant has a pistil formed with big quantities of carpels; its fruit is fruit case which dehisce by small holes. This is ...

- A. *Chelidonium ma jus* (rock poppy)
- B. *Papaver somniferum* (opium poppy)**
- C. *Zea mays* (maize)
- D. *Mentha piperita* (peppermint)
- E. *Sanguisorba officinalis* (greaterbumet)

2. The plant from the Poppy Family contains milky sap of yellow coloring, it has umbel-shaped inflorescence, flowers with deciduous calyx and 4 yellow petals. This is ...

- A. *Taraxacum officinale* (dandelion)
- B. *Robinia pseudoacacia* (black locust)
- C. *Papaver somniferum* (opium poppy)
- D. *Chelidonium majus* (rock poppy)**
- E. *Glaucium flavum* (yellow horned poppy)

3. Investigated plant of the *Papaveraceae* (*Poppv*) Family has lacticifers with yellow and orange latex in all its organs. It's typical for ...

- A. *Chelidonium majus* (rock poppy)**

- B. *Ranunculus acris* (species of buttercup)
- C. *Adonis vernalis* (spring vernalis)
- D. *Papaver somniferum* (opium poppy)
- E. *Aconitum napellus* (aconite)

THE FABACEAE FAMILY

1. Investigated flowers have papilionaceous type of corolla. This plant belongs to the ... Family.

- A. Ranunculaceae (Buttercup)
- B. Scrophulariaceae (Figwort)
- C. Fabaceae (Legume)**
- D. Lamiaceae (Mint)
- E. Asteraceae (Sunflower)

2. The flowers of *Astragalus dasyanthus* (milk vetch) sit on the shortened and thickened main axis, forming a simple inflorescence, which is called ...

- A. spike
- B. corymb
- C. catkin
- D. panicle
- E. glome**

3. Leaves of the *Pisum sativum* (pea) attach to stem with help of the tendrils. These tendrils are metamorphoses of ...

- A. leaflets of the compound leaf**
- B. petiole of the compound leaf
- C. simple leaves
- D. petiole
- E. stipules

4. The representative of the Fabaceae Family has pinnately compound leaves, stipules, modified as spines, and a drooping raceme. This is...

- A. *Pisum sativum* (garden pea)
- B. *Artemisia vulgaris* (mugwort)
- C. *Aronia melanocarpa* (black chokeberry)
- D. *Robinia pseudoacacia* (black locust)**
- E. *Quercus robur* (English oak)

5. Plant of Fabaceae (Legume) Family has well-developed rhizome with roots and stolons, pinnately compound leaves with 5 or 7 pairs egg-shaped, glandulous leaves, and friable and axillary racemes. Flowers are faint-violet. Legumes are indehiscent. Underground organs are used as an expectorant drug and for improvement of the drug taste. This plant is ...

- A. Glycyrrhiza glabra (sweet root)**
- B. Melilotus officinalis (sweet clover)
- C. Robinia pseudoacacia (black locust)
- D. Ononis arvensis (restharrow)
- E. Astragalus dasyanthus (milk vetch)

6. At the medicinal pectoral collection we discover brightly yellow pieces of the root with a sweet taste. It is determined that this root is of the ...

- A. Valeriana officinalis (common valerian)
- B. Althaea officinalis (sweatweed)
- C. Acorus calamus (sweet flag)
- D. Glycyrrhiza glabra (licorice)**
- E. Sangisorba officinalis (greater burnet)

7. While studying five herbarium specimens of medicinal plants, it was determined that one plant belongs to the Fabaceae (Legume) Family namely ...

- A. Melilotus officinalis**
- B. Atropa belladonna
- C. Hyoscyamus niger
- D. Datura stramonium
- E. Solanum tuberosum

8. The industrial source of rutin and of quercetin is flowers of a plant from the Fabaceae (Legume) Family...

- A. sophora japonica**
- B. locust pseudo-acacia
- C. caragana
- D. astragalus
- E. silver wattle acacia

THE ROSACEAE FAMILY

1. One of the common features of the representatives of subfamily Prunoideae from the Rosaceae (Rose) Family is that their fruit is...

- A. berry
- B. aggregate-accessory
- C. drupe**
- D. apple
- E. pepo

2. Fleshy false cenocarpous fruit of the Rosaceae (Rose) Family is formed from hypanthium and inferior ovary. Seeds are surrounded by cartilaginous endocarp. This is...

- A fruit case
- B. silicle
- C. achene
- D. silique
- E. pome**

3. Which of the following plants has pome fruits?

- A *Prunus domestica*
- B. *Amygdalus communis*
- C. *Prunus spinosa*
- D. *Sorbus aucuparia***
- E. *Rosa majalis*

4. Among studied plants berrylike pome is typical for the species of ...

- A. *Aronia melanocarpa* (black chokeberry)**
- B *Prunus spinosa* (blackthorn)
- C. *Rosa canina* (dog rose)
- D. *Padus racemosa* (bird cherry)
- E. *Amygdalus communis* (common almond)

THE HEATH FAMILY

1. It is determined, that one of the common features for *Vaccinium vitis-idaea* (foxberry) and *Vaccinium myrtillus* (bilberry) is that their type of fruit is ...

- A. drupe
- B. fruit case

C. follicle

D. berry

E. cremocarp

2. Studied leaves of the Ericaceae (Heath) Family are short-petiolate, oblong-linear with reflected down edges; from above – coriaceous, glabrous, brown and green; from below – red-haired and densely downy. These leaves are typical for ...

A. Ledum palustre (marsh tea)

B. *Arctostaphylos uva-ursi* (bearberry)

C. *Vaccinium vitis-idaea* (foxberry)

D. *Vaccinium myrtillus* (bilberry)

E. *Oxycoccus palustris* (wild cranberry)

3. Leaves of the representative the Ericaceae (Heath) Family are oblong, obovate, narrow at the base into a short petiole, from above it is dark-green, from below lighter, without dark dotted glandules with well-seen net of veins. This is ...

A. *Vaccinium vitis-idaea* (foxberry)

B. *Arctostaphylos uva ursi* (bearberry)

C. *Ledum palustre* (marsh tea)

D. *Vaccinium oxycoccus* (wild cranberry)

E. *Vaccinium myrtillus* (bilberry)

4. Studied leaves of the Ericaceae (Heath) Family are alternate, short petiolate, glabrous, elliptical with emarginated apex, with reflected down edges; from above rifle-green; from below – with dark dotted glandules. These leaves are typical for ...

A. *Vaccinium vitis-idaea* (foxberry)

B. *Arctostaphylos uva-ursi* (bearberry)

C. *Ledum palustre* (marsh tea)

D. *Vaccinium oxycoccus* (wild cranberry)

E. *Vaccinium myrtillus* (bilberry)

5. While the analysis of the vital form of *Arctostaphylos uva-ursi* (bearberry), *Vaccinium vitis-idaea* (foxberry), *Vaccinium myrtillus* (bilberry) we determine that they are ...

A. undershrubs

B. lianas

C. herbs

D. bushes

E. subshrubs

THE POLYGONACEAE FAMILY

1. The investigated leaf has filmy ocrea that embraces the base of the internode. The presence of such modified stipules is a diagnostical feature of ...

- A. the Fabaceae (Legume) Family
- B. the Gramineae (Grass) Family
- C. the Rosaceae (Rose) Family
- D. the Polygonaceae (the Knotweed) Family**
- E. the Solanaceae (Potato or Nightshade) Family

2. While comparative analysis of the plant leaves of Polygonaceae (Knotweed) Family we find, that their common feature is the presence of ...

- A. spines
- B. vaginal
- C. tendrils
- D. ocrea**
- E. bracts

3. A leaf of a plant under examination has a membranous ocrea that envelops the bottom of the internode. The presence of such modified stipules is a diagnostic sign of the following family...

- A. Fabaceae
- B. Solanaceae
- C. Polygonaceae**
- D. Gramineae
- E. Rosaceae

4. Cultivated food plant of the Knotweed (Polygonaceae) Family has a reddish stem and cordate-arrow-shaped leaves. The fruit is a triquetrous nut. This plant is...

- A. *Polygonum bistorta*
- B. *Fagopyrum sagittatum***
- C. *Polygonum hydropiper*
- D. *Polygonum aviculare*
- E. *Rumex confertus*

5. Perennial herbal plant of the Polygonaceae (Knotweed) Family has thick, horizontal, serpentine rhizome and apical spicate inflorescence, which consists of small pink flowers. This is ...

A. Polygonum bistorta (snake-root knotweed)

B. Polygonum persicaria (spotted knotweed)

C. Polygonum hydropiper (water pepper)

D. Polygonum aviculare

E. Rumex acetosa (garden sorrel)

6. The plant of Polygonaceae (Knotweed) Family has dense, upright, spike-shaped inflorescence; its leaves are lanceolate with brown, u-shaped spot; red-brown, ciliated on the side ocreas. These features allow supposing that this plant is ..

A. Rumex confertus (horse sorrel)

B. Polygonum aviculare (knot grass)

C. Polygonum bistorta (snake-root)

D. Polygonum persicaria (spotted knotweed)

E. Fagopyrum sagittatum (common buckwheat)

7. The Rumex acetosa (garden sorrel) early in spring forms radial rosette of macropodous leaves; their leaf blade in its form is...

A. spear-shaped (or hastate)

B. cordate

C. kidney-shaped

D. diamond (or rhombus)-shaped

E. falcated

THE APIACEAE FAMILY

1. The determined plant has fistular, costate stems, the inflorescence is compound umbel, fruit is schizocarpous – cremocarp, which contains ether oils; which is typical for...

A. the Asteraceae (Sunflower) Family

B. the Fabaceae (Legume) Family

C. the Ericaceae (Heath) Family

D. the Brassicaceae (Mustard) Family

E. the Apiaceae (Carrot) Family

2. Investigated plant has edible root; ribbed-striated and fistular stems; leaves are repeatedly pinatisected, petiole with a vagina; inflorescences is compound umbel;

fruit – cremocarp with gum ducts in the pericarp. Such features are typical for plants of the family ...

A. Solanaceae (Potato)

B. Apiaceae (Carrot)

C. Fabaceae (Iegume)

D. Brassicaceae (Mustard)

E. Scrophulariaceae (Figwort)

3. Select the type of a fruit by the following properties: a coenocarp fruit whose mericarps have 5 axial main edges between which secondary edges be contained.

A lot of ethereal oils are contained in the ethereal channels of its pericarp.

A. nut

B. cypsela

C. cremocarp

D. legume

E. silique

4. Plant of the Apiaceae (Carrot) Family has large thrice – pinnatisected leaves on the filamentous segments; inflorescences – compound umbels; yellow flowers and small oblong fruits – cremocarp. Fruits are used for preparation dill water. This is...

A. Foeniculum vulgare (fennel)

B. Anethum graveolens (dill)

C. Carum carvi (caraway)

D. Petroselinum crispum (parsley)

E. Daucus sativus (species of carrot)

5. This poisonous plant of the Apiaceae Family has red-violet points on the stem and obnoxious mouse odor. This is ...

A. Anisum vulgare

B. Conium maculatum

C. Apium graveolens

D. Plantago major

E. Foeniculum vulgare

6. Some medicinal plants can be poisonous. Choose such a plant of the Apiaceae (Carot) Family from the list below.

A. Cicuta virosa

B. Viburnum opulus

- C. *Valeriana officinalis*
- D. *Plantago major*
- E. *Arctium lappa*

THE SOLANACEAE FAMILY

1. Among studied representatives of the Solanaceae (Potato) Family the fruit berry is present in...

- A. *Nicotiana tabacum* (species of tobacco)
- B. *Hyoscyamus niger* (poison tobacco)
- C. *Datura stramonium* (datura)
- D. *Atropa belladonna* (belladonna)**
- E. *Nicotiana rustica* (rustic tobacco)

2. Bacca fruit is typical for the following representative of Solanaceae Family

- A. *Hyoscyamus niger*
- B. *Atropa belladonna***
- C. *Nicotiana tabacum*
- D. *Datura stramonium*
- E. *Datura innoxia*

3. While the identification the *Datura stramonium* (datura) fruit we determine that it is...

- A. berry in orange calyx
- B. bright blackberry
- C. ascidiform capsule with lid
- D. flash globular cynarodium
- E. septifragal capsule**

THE LAMIACEAE FAMILY

1. Adenotrichous odorous plant has tetrahedral stem, spicate inflorescences consisting of the false whorl, bilabiate corolla, and fruit – tetranutlet, so it belongs to the family...

- A. Solanaceae (Potato)
- B. Scrophulariaceae (Figwort)
- C. Brassicaceae (Mustard)
- D. Apiaceae (Carrot)
- E. Lamiaceae (Mint)**

2. Select the family of the described officinal plant: “Perennial herbaceous plant with an ascending tetrahedral stem, opposite leaf aestivation, and entire leaves. Flowers are zygomorphic, bisexual with bilabiate corolla, and are united into semi-rings in leaf axils. The fruit is coenobium.”

A. Asteraceae

B. Lamiaceae

C. Poaceae

D. Brassicaceae

E. Rosaceae

3. An essential oil plant under examination has a tetraquetrous stem, flowers with bilabiate corolla, coenobium fruit. These characteristics are typical for the following family:

A. Scrophulariaceae

B. Papaveraceae

C. Lamiaceae

D. Polygonaceae

E. Solanaceae

4. The determined essential oil plant has tetraquetrous stem, flowers with bilabiate corolla fruit are coenobium; which is typical for ...

A. the Mint (Lamiaceae) Family

B. the Poppy (Papaveraceae) Family

C. the Knotweed (Polygonaceae) Family

D. the Potato or Nightshade (Solanaceae) Family

E. the Figwort (Scrophulariaceae) Family

4. In the plane cultivation farming there are cultivated officinal ether oil plants, which do not grow naturally in Ukraine, namely: *Mentha piperita* (peppermint) *Ortosiphon stamineus* and...

A. *Thymus serpyllum* (wild thyme)

B. *Origanum vulgare* (common origanum)

C. *Leonurus cardiaca* (motherwort)

D. *Salvia officinalis* (garden sage)

E. *Melissa officinalis* (lemon balm)

5. With the purpose of preservation sort quality we choose optimal way of the *Mentha piperita* (peppermint) reproduction, using

A. culling of the leaves

- B. parts of tuber
- C. parts of rhizome**
- D. seeds
- E. reproductive buds

6. Folk medicine uses flowers of white deadly nettle (*Lamium album*) to cure diseases of spleen, catarrh and others. What family this plant belongs to?

- A. Lamiaceae (mint)**
- B. Ranunculaceae (buttercup)
- C. Solanaceae (potato)
- D. Asteraceae (aster)
- E. Fabaceae (legume)

7. Species characters of the *Thymus – serpyllum* are the existence of apical cephalanthium, dark dotted glandules on the underside of a leaf, long fuzzes along the edge of a base and furthermore:

- A. thorn with spine
- B. thorn shoot
- C. decumbent thorn**
- D. climbing thorn
- E. shortened recumbent thorn

THE SCROPHULARIACEAE FAMILY

1. Medical plants of the *Digitalis* genus contain cardiac glycosides and are used as a raw material for cardiovascular insufficiency drugs. They belong to the Family ...

- A. Solanaceae
- B. Lamiaceae
- C. Apiaceae
- D. Scrophulariaceae**
- E. Polygonaceae

THE RANUNCULACEAE FAMILY

1. Perennial herb plant of the Ranunculaceae Family has repeatedly pinnatisected leaves; apical, large, actinomorphic yellow flowers. This is ...

- A. *Daucus carota* (species of carrot)
- B. *Aconitum napellus* (aconite)
- C. *Brassica nigra* (black mustard)

D. *Rosa canina* (dog rose)

E. ***Adonis vernalis* (spring vernalis)**

THE ASTERACEAE FAMILY

1. The plant has ether oil glandule, its fruit is ashen and its inflorescence is anthodium. These are the diagnostic features of the family...

A. Scrophulariaceae

B. Asteraceae

C. Solanaceae

D. Lamiaceae

E. Rosaceae

2. In antodiums of Asteraceae (*Sunflower*) representatives we determined the flowers all stated types except...

A. ligulate

B. tubular

C. bilabiate

D. false-ligulate

E. thimble (funnel term)

3. Perennial plant of the Asteraceae Family has larges, single and apical anthodiums with purple false-ligulate flowers. It is used to strengthen immunity. This is ..

A. *Artemisia absinthium* (common wormwood)

B. *Achillea millefolium* (common yarrow)

C. *Chamomilla recutita* (common camomile)

D. *Echinacea purpurea* (purple cone-flower)

E. *Taraxacum officinale* (dandelion)

4. Investigated herb plant has articulate laticifers with anastomoses, which contain white latex, which is typical for ..

A. *Taraxacum officinale* (dandelion)

B. *Ranunculus acris* (species of buttercup)

C. *Adonis vernalis* (spring vernalis)

D. *Papaver somniferum* (opium poppy)

E. *Aconitum napellus* (aconite)

5. *Calendula officinalis* (pot marigold) has inflorescences, which is called...

A. head

B. anthodium

C. raceme

D. spadix

E. corymb

6. In anthodiums of *Calendula officinalis* (marigold) in the center there are tubular sterile flowers and on the border - ...

A. false-ligulate, fertile flowers

B. tubular, fertile flowers

C. patelliform, sterile, flowers

D. ligulate, sterile flowers

E. false-ligulate, sterile flowers

7. While studying the samples of medicinal plants we determine that the *Asteraceae* (Sunflower) Family belongs...

A. *Vinca minor* (common periwinkle)

B. *Atropa belladonna* (belladonna)

C. *Quercus robur* (English oak)

D. *Urtica dioica* (great nettle)

E. *Taraxacum officinale* (dandelion)

8. What medical plant of the *Asteraceae* Family has all yellow ligulate and bisexual flowers which form anthodium?

A. *Tussilago farfara*

B. *Bidens tripartita*

C. *Taraxacum officinale*

D. *Tanacetum vulgare*

E. *Arnica montana*

9. At the practice of procurement of *Compositae* plants the notion of “flower” may have both meanings: a single flower as well as an inflorescence. However, in botany, the notion of “flower” is correct for...

A. *Gnaphalium uliginosum*

B. *Centaurea cyanus*

C. *Arnica montana*

D. *Echinops ritro*

E. *Bidens tripartita*

THE ALLIACEAE FAMILY

1. The comparison of representatives of different families shows that the umbel-like inflorescence with spathe, simple perianth, fruit – fruit case and underground organ – bulb are typical for the species of the family....

- A. Solanaceae (Potato)
- B. Rosaceae (Rose)
- C. Fabaceae (Legume)
- D. Brassicaceae (Mustard)
- E. Alliaceae (Onion)**

2. The analyzed bulbous plant has a specific odor, radical cylindrical leaves, utricular flower stalk, bearing simple umbel with filmy spathe, and its fruit is fruitcase. These features indicate that it is ...

- A. Allium cepa (common onion)**
- B. Allium sativum (garlic)
- C. Convallaria majalis (lily-of-the-valley)
- D. Agropyrum repens (couch-grass)
- E. Acorus calamus (sweet flag)

THE GRAMINEAE FAMILY

1. In the prepared flowers perianth is reduced to 2 films, 3 stamens are on the long stamen filaments, the pistil is with 2-lobed plumose stigma, which is typical for...

- A. the Alliaceae (Onion) Family
- B. the Fabaceae (Legume) Family
- C. the Convallariaceae (Lily-of-the-valley) Family
- D. the Gramineae (Grass) Family**
- E. the Asteraceae (Sunflower) Family

2. While studying under the magnifying glass the flowers of Zea mays (maize) gathered in inflorescence spadix it is determined that flowers are ...

- A. male
- B. female**
- C. bisexual
- D. asexual
- E. achlamydeous

3. While weeding the bed perennial weed from Gramineae (grass) Family occurred more often, which rhizome is a medicinal agent that normalizes metabolism and diuresis. This is ...

A. *Triticum aestivum* (soft wheat)

B. *Agropyron repens* (couch-grass)

C. *Zea mays* (maize or corn)

D. *Avena sativa* (oats)

E. *Oryza sativa* (rice)

MEDICINAL PLANTS OF DIFFERENT FAMILIES

1. The plant of the Rhamnaceae Family has an alternating leaf position and has no thorns. Its venation is pinnate with 6-8 pair straight lateral veins. This is ...

A. *Frangula alnus*

B. *Rhamnus cathartica*

C. *Padus racemosa*

D. *Aronia melanocarpa*

E. *Sambucus nigrum*

2. Black, flesh fruits with 3 or 4 seeds have a laxative effect, they are gathered from diocious, thorny bush with opposite branching. This plant is ...

A. *Frangula alnus* (black dogwood)

B. *Aronia melanocarpa* (black chokeberry)

C. *Rhamnus cathartica* (common buckthorn)

D. *Sambucus nigra* (European elder)

E. *Viburnum opulus* (European dogwood)

3. Perennial plant of the Malvaceae (mallow) Family is used as an expectorant drug. Leaves 3-5-palmalilobate; flowers are large, pink, axillary and aggregated in racemose inflorescences. The fruit is cremocarp. This is ...

A. *Tussilago farfara* (colt's foot)

B. *Fragaria vesca* (wild strawberry)

C. *Potentilla erecta* (tormentil)

D. *Althaea officinalis* (marshmallow)

E. *Thymus serpyllum* (wild thyme)

4. *Valeriana officinalis* (common valerian) has well-developed main axes of the inflorescence from which grow axis of next orders with dichasiums, which are situated on the same level. This is...

- A. simple corymb of the dichasiums
- B. corymbose panicle of the dichasiums**
- C. compound corymb of the dichasiums
- D. compound spike of the dichasiums
- E. compound umbel of the dichasiums

5. Investigated plant is a tree with opposite palmately compound leaves, without stipules. Flowers are collected in upright pyramidal thyrus – panicle of the bostryxes. Fruit is specular roundish fruit case with one semen. These features are typical for ...

- A. Aesculus hippocastanum (horse chestnut)**
- B. Rhamnus cathartica (common buckthorn)
- C. Quercus robur (English oak)
- D. Hippophae rhamnoides (sea buckthorn)
- E. Apium graveolens (celery).

6. The fruit, globular fruit case with thorns, is considered. It opens with three valves, contains one large, dark-brown, bright seed with a light lusterless spot. This fruit belongs to ...

- A. Aesculus hippocastanum (horse-chestnut)**
- B. Papaver somniferum (opium poppy)
- C. Datura stramonium (devil's-trumpet)
- D. Plantago major (common plantain)
- E. Hypericum perforatum (common St. John's wort)

7. Fruit of the Tilia cordate (small-leaved lime) is pseudomonocarpous with firm skinny pericarp and 1 or 2 seeds. This is ...

- A. achene
- B. silicle
- C. nutlet**
- D. silique
- E. fruit case

8. During the determination of fruit type Hypericum perforatum it was found that the fruit is coebocarpous, dry, opens with valves and contains a big number of seeds. Therefore the fruit of Hypericum perforatum is....

- A. multifollicle
- B. fruit case**
- C. agrigate achene

- D. follicle
- E. coenobium

9. The plant belongs to the Berbereceae Family. This is...

- A. *Chelidonium majus*
- B. *Adonis vernalis*
- C. *Podophyllum peltatum***
- D. *Saponaria officinalis*
- E. *Hypericum perforatum*

10. Yellow-orange oblong pseudomonocarp drupes rich in vitamins and fatty oil are gathered from a female dioecious thornbush

- A. *Rhamnus cathartica*
- B. *Hippophae rhamnoides***
- C. *Amygdalus communis*
- D. *Sambucus nigra*
- E. *Prunus spinosa*

GLOSSARY

Achene is a small dry pseudomonocarpous one-seeded indehiscent fruit with a skinny pericarp (typical for the Asteraceae family).

Acid is a substance that dissociates in water liberating hydrogen ions.

Acorn is a dry fruit formed with three dehiscent carpels from the inferior ovary with a skinny pericarp; it has a cup-shaped cupule formed from the imbricated.

Active transport is the consumption of energy by a cell in moving a substance across a plasma membrane against a diffusion gradient.

Adventitious buds are developed on any part of vegetative organs; they provide vegetative reproduction.

Adventitious roots are developed along with shoots or on leaves.

Aerenchyma is a venting tissue with the large air cavity; especially well-developed in hygrophytes and hydrophytes.

Agar is a gelatinous substance produced by certain red algae and also by some brown algae; it is often used as a culture medium, particularly for bacteria.

Aggregate fruit is a fruit formed from a single flower; has several to many pistils.

Aleuronic grains are hard inclusions of reserve proteins in storage tissues of the seeds, bulbs, rhizomes and other organs; form from exsiccant vacuoles.

Algin is a gelatinous substance produced by certain brown algae; it is used in a wide variety of food substances and pharmaceutical, industrial, and household products.

Androecium is an aggregate of the stamens of the male part of the flower.

Angiosperm is a high seeded plant with a flower, which after double fertilization develops into a fruit.

Annual plant is a plant that completes its entire life cycle in a single vegetation period.

Annual ring is a single season's production of xylem (wood) by the vascular cambium.

Anther is the pollen-bearing part of a stamen.

Anthocyanes are water-soluble pigments found in the cell sap; differ in colour from red to blue.

Apical meristem is a meristem at the tip of a shoot or root and provides their growth lengthwise.

Archegoniophore is a stalk bearing an archegonium.

Archegonium is the multicellular female gametangium of bryophytes and most vascular plants other than angiosperms.

Ascending current delivers water and solutions of mineral substances from the root to the over ground parts of plants.

Asexual reproduction is any form of reproduction without involving the union of gametes.

Assimilation is cellular conversion of the raw material into protoplasm and cell walls.

Axil is the angle formed between a stem and the petiole of a leaf on the shoot.

Bark is the peripheral part of the stem and the root located from outside.

Berry is a cenocarpous many-seeded fruit with a juicy pericarp.

Callose is a carbohydrate complex that develops in sieve tubes in autumn and can dissolve in the spring.

Callus is the undifferentiated tissue that develops around injured areas of stems and roots and promotes wound healing.

Calyx is a green part of a flower consisting of sepals.

Cambium is a meristem producing secondary conductive tissues – phloem and xylem.

Capsule is a dry cenocarpous fruit that splits in various ways when matured.

Carpel is an ovule-bearing unit that is part of pistil.

Caryopsis is a dry pseudomonocarpous one-seeded indehiscent fruit, in which the pericarp is tightly fused to the seed; it does not split when matured; typical for the Grass family.

Casparian strip is thickening of tangential and radial cell walls of the endoderm.

Cell is the basic structural and functional unit of all living organisms; an elementary live system capable of self-regulation and self-renewal, in

plants, it consists of the protoplasm surrounded by the cell wall.

Cell biology is the biological discipline involving the study of cells and their functions.

Cell cycle is a sequence of events involved in the division of a cell.

Cell idioblasts are secretory cells situated among homogenous tissues; differ in size, color and content.

Cell membrane – see *plasma membrane*.

Cell sap is the liquid content of a vacuole containing organic and inorganic substances.

Cell wall is a part of the plant cell surrounding the protoplast and is the product of its life activity; has the protective function.

Central cell nucleus is an essential organelle of the eukaryote cell containing chromatin its main function is hereditary information transfer.

Chlorenchyma is the basic tissue composed of parenchyma cells that contain chloroplasts; carries out chlorophyll chloroplast the function of photosynthesis.

Chloroplasts are disk-like organelle containing chlorophyll found in cells of most photosynthetic organisms.

Chromoplast is a plastid containing carotenoids, the pigments are usually yellow to orange.

Cladophyll is a flattened modified green stem that resembles a leaf; also called phylloclade.

Class is one of the highest taxonomic categories of classification between a division and an order.

Coleoptile is the first leaf of the cereal germ covering apical meristem and the leaf primordium.

Coleorhiza is a protective sheath surrounding the emerging radicle (immature root) of members of the Poaceae family.

Collective fruit is an aggregate of fruits derived from flowers of a dense inflorescence.

Collenchyma is the live mechanical tissue composed of cells with unevenly thickened walls.

Community is a collective term for all the living organisms sharing a common environment and interacting with one another.

Companion cell is a phloem element with a large nucleus, thick cytoplasm, and a great number of ferments; it forms during the longitudinal division of the sieve tube; it regulates the activity of the sieve tube.

Compound leaf is a leaf consisting of several leaflets falling separately in autumn.

Compound starch grain has several formation centers.

Conductive bundle is an aggregation of conductive elements (vessels, tracheides and sieve tubes), mechanical and parenchymal tissues; function in conducting water and organic substances.

Cork is a tissue composed of cells, which walls are impregnated with

suberin at aging; the outer layers of the tissue of an older woody stem; produced by the cork cambium.

Cork cambium is a secondary lateral meristem, which forms periderm.

Corm is a vertically oriented, thickened food-storage stem with a large disk, filmy leaves and without fleshy leaves.

Corn seed – see *caryopsis*.

Corolla is a part of a flower consisting of petals.

Cosmopolite is a species distributed almost all over the globe.

Cotyledon is an embryo leaf (“seed leaf”) that usually either stores or absorbs nutrients.

Creomocarp is a dry cenocarpous fruit of the Carrot family, which consists of two mericarp.

Cuticle is a waxy or fatty layer of varying thickness on the outer walls of epidermal cells.

Cutin is the waxy or fatty substance, a ticle is composed of it.

Cutting is any vegetative plant part used for vegetative propagation.

Cytology – see *cell biology*.

Cytoplasm is the protoplasm of a cell without nucleus.

Deciduous is a plant shedding leaves annually.

Descending current brings products of photosynthesis from leaves to all parts of plants.

Development changes in the form of a plant resulting from the growth and differentiation of its cells into tissues.

Dichasium can be two lateral axes of the second and following orders located opposite each other.

Dicotyledon is a class of angiosperms, which seeds commonly have two cotyledons, frequently abbreviated to dicot.

Diffusion is the random movement of molecules or particles from a region of higher concentration to a region of lower concentration, ultimately resulting in uniform distribution.

Dioecious is a plant having unisexual flowers or cones, with the male and the female flowers or cones located on different plants.

Disinfestation is the eradication of insects and rodents.

Diuretic is a substance tending to increase the flow of urine.

Division is the largest undivided category of classification of organisms within a kingdom.

DNA is standard abbreviation of deoxyribonucleic acid, the carrier of genetic information in cells and viruses.

Dormancy is a period of the growth inactivity in seeds, buds, bulbs, and other plant organs even when environmental conditions normally required for growth are met.

Double fertilization is a sexual process of the angiosperms; the more or less simultaneous union of one sperm and egg (forming a zygote) and union of another sperm and the central cell nuclei (forming a primary

endosperm nucleus) that occur in the megagametophyte of flowering plants.

Drupe is a simple fleshy fruit whose single seed is enclosed within a hard endocarp.

Druses are crystal cell inclusions in the shape of asterisks.

Ecology is the biological discipline involving the study of the relationships of organisms to each other and their environment.

Ecosystem is a system involving interactions of living organisms with one another and with their non-living environment.

Elater is a straplike appendage attached to a horsetail (*Equisetum*) spore; also a spindle-shaped sterile cell occurring in large amounts in liverwort sporangia; both types of elaters facilitate spore dispersal.

Embryo is immature sporophyte that develops from a zygote within an ovule or archegonium after fertilization.

Endemic plants are ones that distributed on the certain small territory.

Endocarp is the innermost hard layer of a fruit surrounding the seed.

Endoderm is the inner layer of cells of the primary cortex of axis organs.

Endoplasmic reticulum is a complex system of interlinked double-membrane channels subdividing the cytoplasm of a cell into compartments; it can be covered with ribosomes.

Endosperm is a food-storage tissue in the seeds of most plants.

Epicotyl is the part of an embryo or germ above the attachment point of the cotyledon(s).

Epidermis is the exterior tissue, usually one cell thick, covering leaves, young stems and other parts of plants.

Epigynous is a flower part attached above the ovary.

Epiphyte is an organism that is attached to and grows on another organism without parasitizing it.

Essential oil is biologically active fluid volatile organic substances of the plant origin with a specific odor.

Eukaryote is an organism which cells contain the complete nucleus.

Evolution is irreversible process of the historical development of nature on the Earth involving converting one organic forms to qualitatively different ones due to their adaptation to the changed conditions of existence.

Exocarp is the outermost layer of a fruit wall.

False umbel. There are the lateral axes of the secondary order located verticillately; they carry flowers.

Fatty oil is fluid plant fat accumulating in oleoplasts as drops; it is the best source of energy in the cell.

Fertilization is formation of a zygote through the fusion of two gametes.

Fiber is a long thick-walled cell having the mechanical function.

Filament is a threadlike body of certain bacteria, algae and fungi.

Flora is historic aggregate of plants of a definite territory.

Floret is a small flower that is a part of the inflorescence of members of the Asteraceae family and the Poaceae family.

Flower is a modified, shortened, unbranched and limited in its growth shoot.

Follicle is a dry fruit that splits along one side.

Forest is plant association where wood forms prevail.

Fruit is a mature ovary usually containing seeds and covered with the pericarp; forms after the pistil's fertilization.

Fucoxanthin is a brownish pigment occurring in brown and other algae.

Fungi deal with a Kingdom of living nature; heterotrophic one – and multicellular eukaryotic organisms different in structure and form of the vegetative body – mycelium; contains storage substances – glycogen and fats; the cell wall contains chitin.

Gametangium is a plant sexual organ, in which gametes are produced.

Gamete is a male or female sex cell; one of two cells that unite, forming a zygote.

Gametophyte is the haploid (n) generation in the life cycle of plants that develops from a haploid spore and carries sexual organs.

Generative cell is the cell of the male gametophyte of angiosperms that divides producing two sperms; also, the cell of the male gametophyte of gymnosperms that divides producing a sterile cell and a spermatogenous cell.

Genetics is a biological discipline that studies heredity.

Genotype is the genetic constitution of an organism, determining its hereditary characteristics.

Genus is a category of classification between a family and a species.

Germination is the beginning or resumption of growth of a seed, spore or bud.

Glandular hair is exogenous secretory structure; consists of a long multicellular stalk and small secretory capitulum.

Glandule is an exogenous secretory structure, producing and extracting essential oils; consists of short stalk and secretory capitulum, which may include different number of cells.

Graft is transplantation of the part of the shoot from one plant to another, which is resistant to unfavorable conditions, with their further accreting.

Granum is a series of stacked thylakoids within a chloroplast.

Growth is progressive increase in size and volume through natural development.

Gum canal – see *resin canal*.

Guttation is the exudation of drops of water with solutions of mineral salts through hydathodes from leaves due to the root pressure.

Gymnosperm is a plant, which seeds are not enclosed within an ovary during their development (e. g., pine tree).

Gynoecium is an aggregate of the pistils (or carpels) – female

reproductive organs, being usually in the center of the flower.

Hairs are growths of the epidermis, which differ in form and size are diagnostic features for microscopical analyses.

Haustorium is a protuberance of a fungal hypha or plant organ such as a root that functions as a penetrating and absorbing structure.

Herb is a life form of annual, biannual or perennial plants that have herbaceous overground shoots.

Herbarium is a collection of dried pressed specimens, usually mounted on paper and provided with a label giving information as for their names and place of collection.

Heterospory is the production of both microspores and megaspores.

Heterotrophic is incapable of synthesizing food and, therefore, dependent on other organisms for it.

Hybrid is heterozygous offspring of two parents that differ in one or more inheritable characteristics.

Hydathode is the structure at the tip of a leaf vein, through which water is forced as drops by the root pressure.

Hypanthium is a part of the flower of some families (e. g., Rosaceae, Fabaceae), which is formed by accreting of the receptacle and parts of the perianth.

Hypocotyl is the portion of the shoot in germs of flowering plants between the radicle and the cotyledon(s).

Hypodermis is one or several layers of thick-walled cells immediately

beneath the epidermis; has mechanical and water-bearing functions.

Hypogynous is something that has flower parts attached below the ovary

Inferior ovary is an ovary formed by accreting parts of the flower (calyx, corolla, and stamens) with the concave receptacle.

Inflorescence is a collective term for a group of flowers attached to a common axis in a specific arrangement.

Integument is the outermost layer of an ovule; usually develops into a seed coat; a gymnosperm ovule usually has a single integument, and an angiosperm ovule usually has two integuments.

Internode is a shoot region between nodes.

Isogamy is sexual reproduction in certain algae and fungi having gametes that are alike in size.

Lamina – see *blade*.

Laticifer is the inner secretory tissue; specialized cells or ducts resembling vessels; they form branched networks of latex-secreting cells.

Leaf is a flattened, usually photosynthetic structure arranged in various ways on a shoot.

Leaf arrangement is an order of the leaf position on the stem relatively to each other.

Leaflet is one of the subdivisions of a compound leaf

Leaf scar is the scar left on a stem when a leaf separates from it through abscission.

Leaf trace is an aggregation of conductive bundles of the leaf, which enter the node.

Legume is a monocarpous dry fruit, dehiscent along to ventral and dorsal seams; the seeds being attached along the edges.

Lenticel is the outer structure of the periderm, which permits gas exchange between the interior of a plant and the external atmosphere.

Leucoplast is a colourless plastid commonly associated with starch, fatty oil and protein accumulation.

Liana is a ligneous and herbal climbing plant, which cannot maintain vertical position without support.

Life form is the habitus of the plant, formed due to the ecological factors and hereditarily fixed.

Lignification is a secondary change of the cell wall as a result of lignin appearance in its composition; provides fastness and solidity of the cell wall.

Lignin is a compound organic substance, with which certain cell walls (e. g., those of wood) become impregnated.

Lipid is a general term for fats, fatty substances, and oils.

Long-day plant is a plant in which flowering is not initiated unless exposure to more than a critical day length occurs.

Meadow is the type of herbaceous vegetation formed mainly with perennial mesophytes, which develop during the whole vegetative period.

Megagametophyte is the female gametophyte of angiosperms, which in approximately 70 % of the species investigated contains eight nuclei.

Megaphyll is a leaf having branching veins; it is associated with a leaf gap.

Megasporangium is a sporangium, in which megaspores are formed.

Megaspore is a spore that develops into a female gametophyte.

Meristems is the tissue that produces all the primary tissues other than the epidermis and stele (e.g., cortex, pith).

Mesocarp is the middle region of the pericarp that lies between the exocarp and the endocarp.

Mesophyll is the parenchyma (chlorenchyma) tissue between the upper and lower epidermis of a leaf.

Metabolism is the sum of all the interrelated chemical processes occurring in a living organism.

Metamorphose is the modification of the form and structure of the organ or its part in connection with realization of the additional functions.

Microfilament is a protein filament consisting of actin; involved in cytoplasmic streaming.

Microsporangium is a sporangium of the heterosporous plants, in which microspores are formed.

Microspore is a spore of the heterosporous plants that develops into: male gametophyte.

Microsporophyll is a leaf, usually reduced in size, on or within which microspores are produced.

Microtubule is an unbranched tube-like proteinaceous structure commonly found inside the plasma membrane where it apparently regulates the addition of cellulose to the cell wall.

Middle lamella is a layer of the substance, rich in pectin that cements two adjacent cell walls together.

Mineralization is a secondary chemical change of the cell wall as a result of its impregnation with mineral substances.

Molecule is the smallest unit of an element or compound retaining its own identity; consists of two or more atoms.

Monocotyledon is a class of angiosperms whose seeds have a single cotyledon; commonly abbreviated to *monocot*.

Monoecious is something that has unisexual male and female flowers or cones on the same plant.

Multiple fruits – see *collective fruits*.

Mushroom is a sexually initiated phase in the life cycle of a club fungus, usually consisting of an expanded cap and stalk.

Mycelium is a vegetative body of the fungus consisting of fungal hyphae.

Mycorrhiza is a symbiotic association between fungal hyphae and a higher plant root.

Node is region of a shoot where the leaf is attached.

Nucellus is the ovule tissue, within which an embryo sac develops.

Nuclear envelope is a porous double membrane enclosing a nucleus.

Nucleic acid is the DNA that does not code for a gene.

Nucleolus is a somewhat spherical body within a nucleus; contains primarily RNA and protein; there may be more than one nucleolus per nucleus.

Nucleotide is the structural unit of the DNA and the RNA.

Nucleus is the organelle of a living cell that contains chromosomes and is essential to the regulation and control of all the cell functions.

Nut is a one-seeded pseudomonocarpous dry fruit with a hard, thick pericarp; a nut develops with a cup or cluster of bracts at the base.

Nutrient is a substance that provides the elements and energy for the organic molecules that are the building material, from which an organism develops.

Ocrea is a tubulated formation of the stipules, which accrete and envelop the stem.

Oogamy is sexual reproduction, in which the female gamete, or egg, is non-motile and large than the male gamete, or sperm, which is motile.

Oogonium is a female sex organ of certain algae and fungi; it consists of a single cell that contains one to several eggs.

Organelle is a membrane-bound body in the cytoplasm of a cell; there are several kinds, each with a specific function.

Osmosis is the diffusion of water or other solvents through a semipermeable membrane from a region of higher concentration to a region of lower concentration.

Osmotic pressure is the pressure that can be developed by a solution during its movement through a semipermeable membrane to the solution with higher concentration.

Ovary is the enlarged basal portion of a pistil that contains an ovule or ovules and usually develops into a fruit.

Ovule is a structure of seed plants that contains a female gametophyte and has the potential to develop into a seed.

Palisade mesophyll is a mesophyll that has one or more relatively uniform rows of tightly packed, elongated, columnar parenchyma (chlorenchyma) cells beneath the upper epidermis of a leaf.

Papilla is a small, usually rounded or conical growth of the epidermis.

Parasitism is an intimate association between two dissimilar organisms that is harmful to one of them.

Parenchyma consists of thin-walled cells varying in size, shape, and function; is the most common type of the plant cell.

Pectin is a high-molecular polysaccharide occurring primarily in the middle lamella; when combined with organic acids and sugar, it becomes a jelly.

Pedicel is the individual stalk of a flower, with the help of which it is attached to the stem.

Perennial plant is a plant that lives for more than two vegetative periods.

Perianth is the calyx and corolla of flower.

Pericarp is a general term for all the layers of a fruit wall.

Pericycle is a primary lateral meristem; outer layer of the central cylinder cells of the stem and root, with the help of which phylogen, mechanical fibers, secretory structures and lateral roots are formed.

Periderm is a complex secondary covering tissue formed on the surface of stems and underground organs of woody plant forms; composed of cork cells, phylogen and phyloderm.

Perigynous is something that has flower parts attached around the ovary.

Petal is a unit of a corolla; it is usually flattened and colored.

Petiole is the stalk of leaf, with the help of which it is attached to the stem.

Phellogen – see *cork cambium*

Phloem is a complex conducting tissue, which transports products of photosynthesis from leaves to places of their use.

Photosynthesis is the conversion of light energy to chemical energy; water, carbon dioxide, and chlorophyll are all essential to the process, which ultimately produces carbohydrate, with oxygen being released as a by-product photosynthetic units.

Phylloclade – see *chladophyll*.

Pistil is a female reproductive structure of a flower, composed of one

or more carpels and consisting of an ovary, style, and stigma.

Pit is a more or less round or elliptical thin area in a cell wall; pits occur in a more or pairs opposite each other, with or without shallow, domelike borders.

Pith is the central tissue of a dicot stem and certain roots; it usually consists of storage parenchyma cells; can be hollow.

Plant anatomy is the botanical discipline that studies the internal structure of plants and laws of their development.

Plant community is an association of plants inhabiting a common environment and interacting with one another.

Plant ecology is the science that deals with the relationships and interactions between plants and their environment.

Plant geography is the botanical discipline that studies laws of plant distribution over the surface of the earth.

Plant morphology is the botanical discipline that studies external structure of plants, its changes due to the influence of environmental conditions and historical development.

Plant physiology is the botanical discipline that studies general processes, peculiarities of life activity of plant organisms and their interrelation with the environment.

Plant taxonomy is the botanical discipline that studies the classification, nomenclature, and identification of plants.

Plasma membrane is also called cell membrane – a biological membrane of the cytoplasm adjoined to the cell wall and surrounds vacuoles.

Plasmodesma. There are minute strands of the cytoplasm that extend between adjacent cells through pores in the walls.

Plasmolysis is the shrinking in volume of the protoplasm of a cell and the separation of the protoplasm from the cell wall due to loss of water via osmosis.

Pleochasium – see *false umbel*.

Pneumatophore is a spongy root extending above the surface of water, produced by a plant growing in water; pneumatophores facilitate oxygen absorption.

Pollen grain is a structure derived from the microspore of seed plants that develops into a male gametophyte.

Pollen tube is a tube that develops from a pollen grain and carries the sperms to the female gametophyte

Pollination is the transfer of pollen from an anther to a stigma.

Pome is a cenocarpous fleshy fruit; hypanthium takes part in its formation.

Population is a group of organisms, usually of the same species occupying a given area at the same time.

Pore – see *pit*.

Prickle is a pointed outgrowth from the epidermis or cortex beneath the epidermis.

Primary tissue is the tissue produced by an apical meristem (e.g., epidermis,

cortex, primary xylem and phloem, pith).

Primordium is an organ or structure (e.g., leaf, bud) at its earliest stage of development.

Procambium is a primary lateral meristematic and phloem tissue, which produces the primary xylem and phloem.

Prokaryote is the Eukingdom of the organisms which do not have distinct nucleus surrounded with membrane (e.g., bacteria).

Proplastid is a tiny, undifferentiated organelle that can duplicate itself and that may develop into a chloroplast, leucoplast, or other type of plastid.

Protein is a polymer composed of many amino acids linked together by peptide bonds.

Protoplast is the unit of the protoplasm within a plant cell wall; contains the cytoplasm with nucleus and other organelles.

Rachis is the axis of a pinnately compound leaf carrying the leaflets.

Radicle is the part of an embryo in a seed that develops into a root.

Ray. There are radially oriented rows of parenchyma cells that conduct nutrients, water with mineral salts in the stems and roots of woody plants; they are generally continuous across the vascular cambium between the xylem and the phloem; the portion within the wood is called a xylem ray, while the extension of the same ray in the phloem is called a phloem ray

Receptacle is the commonly expanded tip of a pedicel, which the various parts of a flower (e. g., calyx, corolla) are attached.

Relicts are plants preserved from the geological epoch up to our time.

Reproduction is the development of new individual organisms through either sexual or asexual ways.

Resin canal is a tubular duct of many conifers and some angiosperms that is lined with resin-secreting cells.

Rhizoid is a one- or multicellular root or root-hair-like growth of algae, fungi, the gametophytes of bryophytes, and certain structures of some vascular plants; functions in anchorage and absorption water and nutrients.

Rhizome is a modified underground shoot, usually horizontally oriented, that may be superficially root-like in appearance but that has nodes, internodes, filmy leaves, buds and adventitious roots; functions in accumulation of nutrients and vegetative reproduction.

Ribosome is a granular submicroscopic cell organoid composed of two subunits consisting of RNA and proteins; situated on membranes of the endoplasmic reticulum, in the nucleus, plastids, mitochondria; synthesizes protein; very numerous in living cells.

Root is an underground vegetative axis plant organ that functions in anchorage, absorption of water with mineral salts, transport of these solutions to other organs and

vegetative reproduction; there are main, lateral and adventitious roots.

Root cap is a thimble-shaped mass of cells at the tip of a growing root; has the protective function.

Root hair is a growth of epiblema cells that is part of an epidermal cell of the root; absorbs solutions of water and mineral substances from the soil.

Root nodule is a small thickening of lateral or adventitious roots where nitrogen-fixing bacteria accumulate nutrients; typical for the roots of leguminous plants and alders.

Root system is aggregate of roots of single plant; there is the tap root system with a well-developed main root and the fibrous root system where adventitious roots do not differ from each other.

Samara is a dry fruit whose pericarp extends around the a seed in the form of a wing.

Sapwood. There are young outer layers of wood transporting water and minerals in a tree trunk; sapwood is usually lighter in color than heartwood.

Schizocarp is a dry fruit formed by the cenocarpous gynoecium; dehiscent into two mericarps after maturation; typical for Apiaceae family.

Science is a branch of study involved with the systematic observation, recording, organization, and classification of facts, from which natural laws are derived and used predictively.

Sclereid is a sclerenchyma dead cell with a very thickened lignified cell wall penetrated with chinked simple pores; situated by one or in groups in the stem, leaf mesophyll, fruit endocarp and seed cover.

Sclerenchyma is the mechanical tissue composed of lignified cells with thick walls; functions in strengthening and support of the plant.

Secondary tissue is a tissue produced by the vascular cambium or the cork cambium (e.g., virtually all the xylem and phloem in tree trunk).

Secretory cells are alive thin walled cells producing a secret; can be situated by one; can form the head of the glandular trachoma.

Secretory tissues are synthesize, accumulate and extract secrets outside (exogenous tissues) or to the neighboring tissues (endogenous tissues).

Seed is a generative organ of seed plants formed from the ovule containing an embryo and protected by a *seed coat*.

Seed coat is the outer boundary layer of a seed; it is developed from the integument(s).

Semi-compound starch grain has several formation centres; is surrounded with common starch layers

Sepal is a unit of the calyx that can be green or sometimes colored; often functions in protecting the unopened flower bud.

Sessile is without petiole; attached directly by the base.

Sexual reproduction is reproduction involving the union of male and female gametes.

Sieve cell is a longitudinal thin phloem cell with oblique ends; typical for gymnospermous and spore-bearing plants.

Sieve plate is a transverse area of the wall of a sieve tube that contains several to many perforations that permit cytoplasmic connections between similar adjacent cells.

Sieve tube is a conductive phloem elements of the seed plants consisting of the vertical row of alive cells separated by the sieve plates; functions in transport of organic substances.

Silique is a dry fruit that splits along two “seams” with the seeds borne on a central septum.

Simple fruit is a fruit that develops from a single pistil.

Simple gynoecium is formed by one carpel.

Simple leaf is a leaf with the blade undivided into leaflets.

Simple starch grain has one formation center.

Sliming is a secondary chemical change when cell walls transfer into mucus sniphyte.

Sorus is a cluster of sporangia; the term is most frequently applied to clusters of ferns sporangia.

Sperm is a male gamete; except for those of red algae and angiosperms, sperms are frequently motile and are usually smaller than the corresponding female gametes.

Spine is a relatively strong, sharp-pointed, woody structure usually located on a stem; it is usually a modified bud, leaf or its part.

Spongy mesophyll is a mesophyll that has loosely arranged cells and numerous air spaces; situated in the lower part of the leaf just above the lower epidermis.

Sprout is a shoot that grows horizontally along the surface of the ground; typically has long internodes.

Stamen is a male pollen-producing structure of a flower; it consists of an anther and a filament.

Starch grain. There are hard inclusions of the reserve starch, which form in amyloplasts and have formation center, night and light layers; there are simple, compound and semi-compound starch grains.

Stele is the central cylinder of tissues in a stem or root; consists primarily of xylem and phloem.

Stem is a vegetative plant organ of higher plants; axis part of the shoot; consists of nodes and internodes.

Steppe is a temperate zone with xerophytic plants.

Stigma is a apical pollen receptive area of a pistil.

Stipule is one of a pair of appendages of varying size, shape, and texture present at the base of the leaves of some plants.

Stolon is an over- or underground thin stem that grows vertically; typically has relatively long internodes;

sometimes ends with a bulb or a bud; functions in vegetative reproduction.

Stoma is a minute pore or opening in the epidermis of leaves, herbaceous stems; it is flanked by two guard cells that regulate its opening and closing and thus regulate gas exchange and transpiration.

Stroma is the main substance of the cell structures (cytoplasm, organoids and walls).

Suberin is a fatty substance found primarily in the cell walls of cork and the Casparian strips of endodermal cells.

Suberization is a secondary chemical change of the cell wall, impregnation of the cell wall with suberin that leads to die-off of the alive content of the cells.

Subshrub is the life form of the perennial plant up to 1m high with a lignified lower part of the shoot and herbal upper one, which dies every year.

Succulent. There are drought-resistant xerophytes with a fleshy, sappy stem or leaves where much water accumulates (e.g., cactuses).

Superior ovary is an ovary that is free as for the calyx, corolla, and other floral parts; situated above them or at the same level, so the sepals and petals appear to be attached at its base.

Symbiosis is an intimate association between two dissimilar organisms that benefits both of them.

Tannins are complex polyphenol biological active compounds with

cementing properties and astringent taste.

Tendrils are modified leaf or leaflet; coils on contact with a support and aids the plant in climbing.

Thallus is a multicellular plant body that is usually flattened and not organized into roots, stems, or leaves.

Thorn is a pointed outgrowth from an epidermis or cortex beneath the epidermis (e. g. rose).

Thylakoids are disk-like membranes, which include chlorophyll; they are arranged in stacks that form the grana of chloroplasts.

Tissue is an aggregation of cells having a common structure, origin and functions.

Tracheid is a non-perforated xylem cell that is tapered at the ends and has thick lignified walls containing bordered pits.

Transpiration is a physiological process that regulates the extraction of water in the vapor form; most transpiration takes place through the stomata.

Tree is a large perennial plant (up to 100 m high), which lives for many years and has a well-developed root system and the aboveground part consisting of the thick trunk covered with periderm or bark and head (crown).

Trichomes – see *hairs*.

Tropism. There are growth movements of plant organs or their parts due to one-side influence of terrestrial attraction (geotropism),

illumination (phototropism), water (hydrotropism) and chemical substances (chemotropism).

Trunk is the main well developed stem of tree.

Tuber is a modified part of root or a shoot; the organ of the vegetative reproduction and storage of nutrients.

Vacuolar membrane is a plasmatic membrane dividing the cytoplasm from the vacuole; has selective permeability and capacity to ion transport; also called tonoplast.

Vacuole is a pocket of the fluid that is separated from the cytoplasm of a cell by tonoplast and filled with cell sap; it may occupy more than 99 % of the cell volume in plants.

Vascular cambium is a narrow cylindrical sheath of cells that produces the secondary xylem and phloem in stems and roots and provides their growth in width.

Vascular plant is a plant having xylem and phloem.

Vessel is the tubular xylem elements, which cells have lost their cytoplasm and irregularly thickened, occur in the xylem of most angiosperms and a some other vascular plants; each vessel is composed of vessel members laid end to end; the perforated or open-ended walls of the vessel members permitting water to pass through freely.

Whorled is something that has three or more buds, leaves or flowers at a node.

Xylem is the complex tissue that provides the ascending current of water and dissolved minerals utilized by a plant; it consists of conductive elements (vessels and tracheides), mechanical (wood fibers) and storage (wood parenchyma); can be primary and secondary in its origin.

REFERENCES

Compulsory:

1. Pharmaceutical botany : textbook / T. M. Gontova, A. H. Serbin, S. M. Marchyshyn et al. ; ed. by T. M. Gontova. – Ternopil : TSMU, 2013. – 380 p.
2. Gullko R. Explonatory dictionary of medical botany / R. Gullko. – Vinnitsya: «Nova Knyha», 2006. – 218 p.

Supplementary:

1. Приклади тестових завдань. Іспит з іноземної мови професійного спрямування для спеціальності “Фармація” (англійська). URL: <https://testcentr.org.ua/banks/pharm/edki-eng-pharm.pdf>.
2. Anatomy of plant cells, tissues, organs and their morphology / R. Gullko, O. Baran. – Lviv, 2005. 121 p.
3. Chhatwal G. R. Textbook of Botany / G. R. Chhatwal, M. P. Singh. – New Delhi, 2002. – 813 p.
4. Kingsley R. Stern Introductory Plant Biology / Kingsley R. Stern, Shelley Jansky, James E. Bidlack. – 9th ed. Mc Graw Hill, 2003. – 624 p.
5. Pharmacognosy : textbook for higher school students / V. S. Kyslychenko, L. V. Upyr, Ya. V. Dyakonova et. al. ; ed. by V. S. Kyslychenko. – Kharkiv : NUPh : Golden Pages, 2011. – 552 p.
6. Sample test questions. Integrated test exam “Krok 1” Pharmacy. URL: <https://testcentr.org.ua/banks/pharm/k1-pharm-f-eng-2020.pdf>
7. Sundara Rajan S. Plant orphology / S. Sundara Rajan. – New Delhi : Anmol Publications PVT. LTD., 2002. – 813 p.