

Odessa National Medical University

Department of General and Clinical Pharmacology and Pharmacognosy

methodological developments
workshops
for full-time department faculty

Discipline: "Resursovedenie medicinal plants"

Lesson number 9 "LR cultivation in Ukraine and the world. Features of cultivation and selection of HR. Medicinal plants promising for cultivation in Ukraine. Drafting agrokehendatsy on cultivation of medicinal plants in the Odessa region. Drawing up guidelines on harvesting and drying of new plant species of medicinal raw materials, lichens, fungi "

Course 3 Faculty medico-pharmaceutical

approved by
in the methodical meeting of the Department
August 28, 2025
Protocol № 1
Head. Department of



_____ prof. Rozhkovsky YV

Odessa 2025

Subject of practical lesson № 9 "**Cultivation of Latvia in Ukraine and the world. Features of cultivation and selection of HR. Medicinal plants promising for cultivation in Ukraine. Drafting agrotechnical recommendations on cultivation of medicinal plants in the Odessa region. Drawing up guidelines on harvesting and drying of new plant species of medicinal raw materials, lichens, fungi,**" (6 hours).

1. Background. The production of some domestic original or generic herbal remedies in the first place, requires adequate resource base. In the absence of natural resources, one of the possible ways of solving the problem becomes cultivation of plants. To do this, it is very important not only to previous research on the introduction of appropriate agricultural techniques and species, but also the correct zoning imposed by the HR culture. Working out the issues discussed in the next lesson.

2. Purpose of the activity:

teach students

- assess the prospects of the introduction of new industrial culture of medicinal plants of local and foreign floras;
- to make recommendations on the conditions, ways and means of cultivating new LR in the Odessa region.

And also - to take stock of the discipline - drawing up guidelines on harvesting and drying of medicinal raw materials.

2.1. Learning Objectives:

-know (The level of assimilation of Beshpal'ko -II):

1. Basic concepts and terms of agronomic.
2. Problems and Methods of introduction and selection.
3. Modern cultivated assortment of Latvia in Ukraine and the Odessa region.
4. Ecological coenotic, morphological features and biological characteristics of the new medicinal plants introduced into the culture.
5. The main agronomic means growing plants.
6. Modern quality requirements cultivated medicinal plants.
7. Natural and climatic features of the Odessa region, influencing the success of the field of culture crops.

- to be able (Mastering level -III):

1. With the help of information sources highlight the biological characteristics of specific types of LR contributing to the success of their cultivation in the Odessa region.
2. On the basis of thorough analysis of the properties of concrete HR assess the prospects of their introduction into the industrial culture.
3. Allocate new medicinal plants promising for cultivation in the Odessa region.
4. Compile agrotechnical recommendations growing new medicinal plants in the Odessa region.

5. Apply prior knowledge to produce instructions for harvesting and drying of the RL.

2.2. Educational goals:

-sposobstvovat formation of ecological outlook and liability for future pharmacists the use of natural resources, the RL.

3. Interdisciplinary integration:

number	discipline	Know	be able to
1.	previous Medical botany	Phase of development, the environmental conditions of growth of medicinal plants;	To assess the current conditions of growth of specific types of LR
2.	pharmacognosy	The effect of various factors on the contents of the main storage and a bar RL	Choosing optimum blank areas and periods native RL
3.	Intra integration (the topic of this discipline, which integrates that which is studied) ...	Resursovedenie as science and academic discipline. The raw material base of medicinal plants in Ukraine. The use of herbal medicines in the Republic of Lithuania and the modern world medical practice. Accounting for medicinal plant resources, the principles of their management and protection. Cultivation of Latvia in Ukraine and the world.	develop: on the harvesting instructions, drying and storage of raw wild higher plants, algae, lichens and fungi, newsletters; make reports for doctors and advise the public on matters related to the harvesting and use of raw materials and products of natural origin.

4. Content of the topic

The theoretical material topics outlined in the text of the lecture number 5 and the following sources of information:

1. Heinrich M., Barnes J., Prieto-Garcia J., Gibbons S., Williamson E. M. Fundamentals of Pharmacognosy and Phytotherapy. 3rd ed. Elsevier, 2023. 282 p.

2. Medicinal Plant Resources : textbook / V. M. Minarchenko et al. Kyiv : Palyvoda A. V., 2019. 128 p.
3. Bioprospecting of Ethnomedicinal Plant Resources: Sustainable Utilization and Restoration / ed. by G. Shukla et al. CRC Press, 2024. 466 p.
4. Medicinal Plants: Bioprospecting and Pharmacognosy / ed. by A. B. Sharangi, K. V. Peter. Apple Academic Press, 2022. 602 p.
5. Van Wyk B. E., Wink M. Medicinal Plants of the World. 2nd ed. CABI, 2017.

5. Plan and organizational structure of classes

number	The basic stages of employment, their functions and content	Each. goals in development levels	training and controls	Methodological materials. ensuring and the control of knowledge	duration min., or %
1.	Preparatory stage Organizational measures. The wording of the objectives. Checking homework	II		Methodological developments; test items	1 minute. 2 minutes. 7 min.
2.	The main stage. <i>Location</i> - training room. Carrying out practical work	II-III	Maps, slides, herbaria, background and scientific literature	Methodical development - "Resursoznavstvo medicinal plants. Laboratory Journal"	130 min.
3.	The final stage. <i>Location</i> - training room. Check final level of knowledge. Inspection and assessment of practical skills. Checking and signing of the protocols in the laboratory journal. Scoring knowledge. Summing up the lessons and homework wording.	II-III II-III			15 minutes. 10 min. 10 min. 5 minutes.

6. Materials of methodical maintenance of employment.

6.1. control materials for the preparatory phase of exercises

Test questions:

1. What is the introduction of plants?
2. In what direction is developing a study on the introduction of Latvia in Ukraine?
3. What is plant breeding?
4. What HR cultivated in Ukraine? To what extent?
5. What special conditions are needed for the successful cultivation of the Republic of Lithuania?
6. Describe the traditional HR cultivation regions in Ukraine.
7. What are the special challenges HR cultivation in the Odessa region?
8. What are some ways you can create resource base of the Republic of Lithuania foreign floras?

tests:

1. Introduction of plants - is:
 - A. The use of vegetable raw materials cultivated
 - B. Improving the quality of the plants
 - B. Establishment of Plant Varieties
 - G. Growing plants in the new conditions
 - D. Industrial cultivation of plants
2. The main scientific centers of plant introduction in Ukraine have
 - A. Farmers
 - B. Experimental Station
 - V. Department of Botany universities
 - G. Specialized farms green building
 - D. Botanical Gardens
3. The main agricultural agent RL growing in arid conditions of the south of Ukraine is
 - A. Growing in greenhouses
 - B. The cultivation of seedlings
 - B. Use of fertilizers
 - G. Irrigation
 - D. Meticulous weed control
4. Select from this list RL, which is cultivated in Ukraine as a source of medicinal plant raw materials:
 - A mountain arnica
 - B. harrow the field
 - B. Valerian hilly

- G. tormentil
- D. Burnet ordinary

5. Select from the above list has long been known LR is, which is not cultivated in Ukraine:

- A. chamomile
- B. Waybread
- B. Horsetail
- Mr. Peppermint
- D. Valeriana officinalis

6. The raw material needs madder previously met through plantations in Central Asia and Transcaucasia. To create an appropriate domestic resource base is necessary to organize the cultivation of this crop in Ukraine. Perspective for this region:

- A. Donechchyna
- B. Polissia
- V. Karpaty
- G. Prykarpattia
- D. South and Crimea

7. In the specialized farms in the Lviv region. it is planned to lay the plantation of peppermint and recycle it to the essential oil. Choose the best for this region recognized varieties of domestic breeding of provided characteristics:

- A. Drought
- B. Winter hardiness
- V. Large multiplication factor
- D. High levels of menthol
- D. A large size of leaves

6.2. Materials of methodical maintenance of the main phase of occupation

Methods of operation, performing the steps of:

A) Identify and clarify the values of the basic terms and the introduction of measures, agricultural technology and breeding (supplement students own dictionaries of terms and concepts)

B) Identification of the main needs of the Republic of Lithuania during their cultivation on the RL (in the form of conversations and homework polls).

B) Determination of the range of introduced or incorporated into the industrial culture of other regions of Ukraine kinds of herbal drugs with the provided list (for completing the table use advanced knowledge of students, special. Literature and background information from the textbook and the Department of the stands).

D) Clarification of soil and climate characteristics of the southern region (in the form of a conversation)

E) recovering from the list of such LR that are looking to grow it in the south of Ukraine (independent work of students - completing the table).

E) Identify and clarify the values of the basic terms of measures and indicators used in the preparation of agrotechnology HR cultivation.

Emphasize (!) Communication morphological characters (especially seeds) with adaptation of plants to dry growing conditions.

F) Selection and definition of individual tasks (type LR to which each student will be agrotechnology).

C) Selection and study of the necessary information from the sources of scientific and reference books, herbaria, collections of seed samples (independent work of students)

Ii) Preparation of instructions (independent work of students on completing the form provided by the schema).

List of educational and practical tasks to be carried out during the practical sessions:

Exercise 1. With the help of the recommended sources of information to determine the basic terms and find introductions measures, agricultural technology and breeding (supplement own dictionary of terms and concepts - fill tabl.41.)

Table 41

Cultivation of medicinal plants

The term (concept)	Definition (content)
acclimatization	
introduction	
introduction into commercial culture	
plant propagation methods	
cultivation methods	
agricultural agent	
selection	
variety (cultivar)	
reintroduction	

Task 2. Based on data from the recommended scientific and reference literature, lead characterization of species of plants, lichens, fungi - existing or future sources

of medicinal raw materials, to evaluate the prospects of introduction in culture in Ukraine, new types of (fill in Table 42.).

Table 42

The prospect of the introduction to the culture in Ukraine of new natural sources of medicinal raw materials

species name	Life form	natural spread	ecocenotic confinement	Methods rozmnozheniya	known (Potential) cultivation methods	Areas of cultivation or administration prospect
one	2	3	four	five	6	7
Althaea officinalis	Perennial	The flat part of Ukraine	On the banks of freshwater rivers, meadows	Seminal	Sow in the ground	Cultivated in the forest-steppe zone of Ukraine
Aloe						
s great						
Astragalus sherstistotsvetkovy						
vandalroot						
vanilla fragrant						
Visnaga morkvevidnaya						
ginkgo dvolopastnoy						
mustard Chornaja						
adonis Spring						
Fenugreek						
Canadian desmodium						
Echinacea pale						
Echinacea purpurea						
Ginseng						
centaury small						
Canadian Zolotushnik						
madder dyeing						
Machok yellow						

Melissa officinalis						
Peppermint						
elfwort						
orthosiphon staminate						
one	2	3	four	five	6	7
lobed nightshade						
castor bean						
Rhodiola rosea						
Rastropsha spotted						
chamomile						
cyanosis blue						
licorice						
Soy scheti-NIST						
uterine horns						
jujube						
cumin sand						
Thymus vulgaris						
bilberry						
Nigella Damascus						
Salvia officinalis						
Rosehip cinnamon						
Dryopteris male						

Task 3. Select species cultivated in Ukraine, or those that are looking to explore and describe the patterns of their seeds.

List of recommended the study of objects (seed samples): milk thistle; gunba hay; madder dyeing; valerian; Melissa officinalis; elfwort; Echinacea purpurea; Echinacea, pale; black mustard; s large; visnaga morkvevidnaya; Solidago canadensis; soybeans; Nigella Damascus; (Aloe) peppermint; mustard; castor oil; desmodium Canadian; sage; chamomile.

Task 4. Based on the analysis of morphological features and information from the scientific literature, make (provided by the scheme) agrotechnical cultivation of one of the most promising of Latvia in the Odessa region, taking into account the specifics of its agro-climatic conditions.

Driving assembly agrotechnical:

*Agrotechnical
for cultivation in the Odessa region*

Species name (Ukr, Rus, Local, lat...), Family: _____

Biomorphological characteristic (life, habitus, periods: Vegetation, Flowers, Fruit...)

Distribution or origin:

breeding methods:

The recommended method of cultivation:

seed characteristics (shape, size, the shell structure):

The need for seed preparation seed (scarification, stratification; granulation; etching):

Preparation of planting material (mat type, the blank periods, storage conditions.):

Soil Preparation:

Sowing (planting): _____ Scheme seeding (planting): _____

Care of crops, plantations (thinning, hoeing, weeding, fertilizing, weeding, weed control, pests and pathogens) other: _____

Special conditions (sowing with crazy culture, growing under cover other crops, cultivation on irrigated land, growing in areas outside of the crop rotation), another _____

growing conditions at breeding sites: _____

Terms and methods of harvesting (feedstock)

harvest treatment (post-treatment, grinding, wilting, drying, threshing, packing), other:

Expected yield: _____

Use of (marketing) raw materials:

Task 5. Familiarize yourself with herbarium specimens proposed for the development of new medicinal plants, and similar kinds of impurities, to work out relevant scientific and reference literature and composition (under the given scheme) project "Instruction on the harvesting and drying" of the proposed teacher RL.

List of recommended sites in the study:

Pyatnistaya- thistle seeds; biennial *Oenothera* -Family; *Fragaria viridis*-list; *Tribulus terrestris* grass; *Fumaria officinalis* grass; celandine ordinary grass,

comfrey - roots; wild carrot -plody; ironstone barbed-grass; zopnika - grass; meadowsweet vyazolistnaya- rhizomes and roots; white dead-nettle; marshmallow-list; black poplar -pochki; Sophora japonica - buds; Sophora japonica - fruits; Aesculus hippocastanum - seeds; gryzhnik bare-grass; Abraham medicinal -trava; Veronica drug -trava.

on preparation of the draft Guidelines

(name LSR)

1. Ukrainian, Russian. local, the Latin name of the plant family of

2. The appearance of the plant:

3. The periods of flowering, fruiting:

4. Distribution of potential commodity areas:

5. Designated growth, environmental conditions:

6.Zagotovka:

7. Primary raw Processing:

8. Drying (type, temperature, duration):

9. Exterior materials according IDA:

10. Differences from similar types of impurities:

11. Numerical indicators of quality of raw materials:

12. Packing:

13. Storage:

14. Expiry date:

15. Use Paths:

16. Recommendations for the rational use and conservation of resources:

Author:

6.3. Materials control the final phase of occupation

Questions for self-control:

1. On what grounds (principles) are selected for long-term cultivation in the region introduced new LR?
2. What are the specific difficulties LR commercial cultivation?
3. What are the advantages over the wild-growing medicinal plant raw materials cultivated?
5. What are the challenges faced by domestic breeders, who create new varieties of medicinal plants?
6. What are the IDA standardize cultivated RL?
7. What are the medicinal plants that have long been successfully cultivated in Ukraine?
8. What is the cultivation of "in vitro"? What are its advantages and disadvantages of the cultivation in the usual way?
9. Why make all sorts of "instructions"?
10. Formulate the general rules for harvesting of wild medicinal plant raw materials.
11. What requirements must comply with the quality of harvested medicinal plant raw materials?
12. Formulate the general RL retention rules
13. Compliance with all rules of harvesting of wild medicinal plant raw materials contributes to resource conservation.
14. How important is the precise definition of the drying temperature LSR?
15. Identify the general requirements of periodicity preform RL.

Tests and situational tasks:

1. To solve the problem of raw material base, and domestic production of herbal remedies with foreign or deficient LSR may choose different ways: 1 - the import of raw materials; 2 - introduction and establishment of cultural plantations; 3 - Use vidov- substitutes of local flora; 4 - introduction in industrial culture species substitutes; 5 - culturing «in vitro». Select the best solutions to the problem of raw material base: a) of *Echinacea purpurea*; b) a ginseng; c) goritsveta spring; g) *Digitalis purpurea*; d) Canadian *Desmodium*; e) eucalyptus ball.

Answer: A - 2 and 4; b - 1 and 5; in 1; r - 1 and 3; D 2; e - 1.

2. Which of these HR, in your opinion, can be successfully cultivated in the south of Ukraine in large areas without irrigation:

A. Skumpiya ordinary

B. *Rauwolfia serpentina*

V. *Valeriana officinalis*

Mr. Peppermint

Rhodiola rosea D.

3. In the botanical garden of Odessa National University underwent primary introductory test of nearly 100 species of medicinal plants, including: Erwa woolly, madder dyeing, *Valeriana officinalis*, sage. Which of the following types, in your opinion, can be considered as promising for commercial cultivation in the open field: a) irrigation; b) without irrigation.

Answer: madder dyeing - b; ; And - Valeriana officinalis Sage - b.

4. Air solar drying is absolutely unacceptable for

A. chelidonii

B. blueberries

B. oak bark

G. liquorice

D. madder roots and rhizomes

5. hygroscopic RL, for example, lycopodium, packaged in

A. Tin sealed cans

B. Bales at 50 kg

V. Sacks tissue 25 kg

G. Paper bags 25 kg

D. Plywood Boxes

6. The white nettle is the source of a new kind of medicinal plant raw materials - grass white dead-nettle. At the same time it can be considered as an admixture to the raw material of other officinal plants. Call it the plant:

A. Stinging nettle

- B. Leonurus cardiaca
- B. nettle
- G. Lamium purpureum
- D. Baikal skullcap

7. For standard RL grass lily, drying is carried out at a temperature of 50-60 °C to stop a possible biochemical process

- A. The oxidation of terpenoids
- B. The evaporation of the essential oils
- B. Oxidation of Phenolic Compounds
- G. Enzymatic hydrolysis of cardiac glycosides**
- D. The oxidation of tar

8. By what is necessary to maintain the list of belladonna leaves, henbane and datura, containing tropane alkaloids?

- A. According to the list B**
- B. According to the list A
- B. As a general list
- G. On the list of "essential-oil feedstock"
- D. equated to drugs

9. During the feed merchandising analysis revealed that it consists of whole inflorescences, which have the shape of baskets with a diameter up to 5 cm, and reed tubular flowers, reddish-orange color, odor slaboaromatnogo, brackish bitter taste. It is concluded that the raw material is the color:

- A. Hawthorn
- B. Daisies
- B. Marigold**
- G. lilies
- D. Linden

10. At the warehouse received a batch of raw materials - peppermint leaf. Specify the conditions under which it is necessary to keep it raw

- A. At a temperature of -50
- B. In normal conditions
- Q. metal containers
- G. In order to avoid the action of CO₂
- D. Apart from other raw materials**

11. The grass Adonis spring containing kardioglikozidy need to save

- A. According to the list A
- B. In the list B**
- B. Under normal circumstances,
- G. In metal containers
- D. As a raw material containing nutrients

12. Koren marshmallow contains from 10 to 20% polysaccharides. The basic condition for the drying temperature, which should be:

A. 10-15 0C

B. 45-60 0C

V. 80-90 0C

G. 85-95 0C

AD 100-120 0C

13. Pharmacy received the raw material batch - chamomile flowers. At what point is the raw material should be stored:

A. Apart from all kinds of raw materials

B. List B

B. List A

G. How narcotic raw materials

D. The bright spot

14. Describe what is done with the RL after the workpiece:

A. Dry

B. Conduct a primary raw material processing

V. pack

G. Bring to the standard state

D. Label

15. RL in pharmacies retain the different groups under appropriate conditions. Specify the raw materials refers to the total storage LSR Group:

A. The rhizome of valerian

B. Adonis Grass

W. Oak bark

G. Seeds strophanthus

D. The roots of belladonna

16. The corresponding RL harvested in the spring during sap flow. Specify the raw material:

A. Compound fruits

Cora B.

V. Flowers

G. Kidney

D. roots

17. RL Oregano harvested during full bloom one way to specify it:

A. Collect the entire plant, pulling it from the root

B. Dig the whole plant

B. pluck leaves from the stems

G. Grass cut with a knife or a sickle at a distance of 20-30 cm from the ground

D. Cut off only the tops of inflorescences

18. During the collection of medicinal raw materials you need to take precautions: do not try, do not touch with dirty hands face, eyes finishing plant collection, wash your hands thoroughly with soap and water. This is especially true LRS:

A. RL containing tannins

B. RL containing saponins

B. RL containing toxic substances

Mr. RL containing essential oils

D. RL containing steroidal saponins

19. After packer workpiece rejects foreign materials from plants, or unnecessary parts of the same plant raw material and damaged. It refers to:

A. Primary processing raw

B. Preparation of raw materials to the realization of

B. Conduct of research materials

G. Qualitative determination of raw materials

D. Quantification of raw materials

20. RL quality depends on the timing of the preform. Underground roots of organs, tubers, rhizomes should harvest

A. During the growing season

B. Before flowering

B. During flowering

At the end of flowering

D. Early in the spring or autumn

21. The leaves of *Digitalis purpurea* is used to produce cardiotonic agents. At what temperature should be dried is the raw material:

A. 20-25 ° C

B. 30-40 ° C

B. 50-60 ° C

G. 80-90 ° C

D. 90-100 ° C

22. Pharmacy in store grass *Oregano*. What a drying mode must be used to obtain high quality raw materials:

A. 20-250C

B. 35-400C

B. 50-600C

G. 70-80 0 C

D. 80-90 0C

23. harvested herb milfoil in a certain phase of growth. Specify it.
And during budding

B during the mass flowering

As in the course of regrowth

D during fruiting

D to the flowering plants

24. Impurities get into the herbal drugs in harvesting and primary processing.

Organic contaminants include:

A. Glass Shares

B. Metal objects

B. Sand

G. soil particles

D. Shares of the same plant, but not raw

25. Impurities get into the herbal drugs in harvesting and primary processing. For mineral contaminants include:

A similar species

B. Other bodies of the same plant

B. Sand, gravel, rocks

G. Litter birds or rodents

D. Metal objects

26. arnica flowers is used as a hemostat for injuries and bruises. The preform of the raw materials is carried out

A. During the period of budding

B. At the beginning of flowering

B. In the second half of the flowering

G. Suppose harvest flowers and fruits

D. At the end of flowering

27. In analysis of the obtained medicinal herbs: flowers in baskets with a diameter of 4 cm, the edge asexual colors, blue, funnel-shaped; internal - bisexual, purple, tubular. The plant has the following symptoms?

A. *Solidago virgaurea*;

B. *Centaurea cyanus*;

B. *Polygonum persicaria*;

G. *Scutellaria baicalensis*;

D. *Viola tricolor*.

6. 7. Literature Basic literature

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8. Державна Фармакопея України : в 3 т. / ДП «Український науковий фармакопейний центр якості лікарських засобів». 2-е вид. Харків : Науковий фармакопейний центр, 2015. Т. 1. 1128 с.

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14. Heinrich M., Barnes J., Prieto-Garcia J., Gibbons S., Williamson E. M. Fundamentals of Pharmacognosy and Phytotherapy. 3rd ed. Elsevier, 2023. 282 p.
15. Medicinal Plant Resources : textbook / V. M. Minarchenko et al. Kyiv : Palyvoda A. V., 2019. 128 p.
16. Bioprospecting of Ethnomedicinal Plant Resources: Sustainable Utilization and Restoration / ed. by G. Shukla et al. CRC Press, 2024. 466 p.
17. Medicinal Plants: Bioprospecting and Pharmacognosy / ed. by A. B. Sharangi, K. V. Peter. Apple Academic Press, 2022. 602 p.
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Additional literature:

19. Лікарські рослини: Рекомендаційний список літератури (актуальні видання 2024 року) / Уманський НУС.
20. Малопоширені ароматичні види лікарських рослин / Наукове видання. – Берегове: ЗУІ ім. Ф. Ракоці II, 2025.
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24. Medicinal Plant Names Services (MPNS) Resource. Kew Royal Botanic Gardens. URL: [kew.org](https://www.kew.org) (дата звернення: 22.03.2026).
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Methodical recommendations were made by

A handwritten signature in black ink, appearing to be 'Boyko IA', written in a cursive style.

associate professor Boyko IA