Odessa National Medical University

Department of General and Clinical Pharmacology and Pharmacognosy

methodological developments
workshops
for full-time students

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 agrorekomendatsy 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

1. Topic 8: The raw material base of medicinal plants in Ukraine. Geographical and Phytocenological Attachment LR Ukrainian are included in herbal domestic production (6 h)

2. Relevance of the topic. 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.

3. The 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.

3.1. Learning Objectives:

-know (The level of assimilation of Bespal'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 agrorekomendatsii growing new medicinal plants in the Odessa region.
5. Apply prior knowledge to produce instructions for harvesting and drying of the RL.

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

4. Interdisciplinary integration:

number pp	discipline	Know	be able to
one.	**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.

5. The content of lessons
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.

6. Materials for methodological support classes

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. The information necessary for the formation of knowledge, skills can be found in textbooks:

Basic Operation:

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

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

Additional literature:

11. Лікарські рослини: Рекомендаційний список літератури (актуальні видання 2024 року) / Уманський НУС.
12. Малопоширені ароматичні види лікарських рослин / Наукове видання. – Берегове: ЗУІ ім. Ф. Ракоці ІІ, 2025.
13. Лабораторний журнал з ресурсознавства лікарських рослин : [посібник] / В. М. Мінарченко та ін. Київ : Паливода А. В., 2018. 94 с.
14. Фармакогнозія : підручник для студ. вищ. навч. закл. / В. С. Кисличенко та ін. ; за ред. В. С. Кисличенко. Харків : НФаУ : Золоті сторінки, 2015. 736 с.

6.3. Indicative map for independent work with literature

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	

7. Materials for self-control of quality of training

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.

8.Materialy for classroom self-study:

8.1. List of educational practical tasks which must be completed during the practical (laboratory) classes:

Exercise 1. 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)	Areas of cultivation or administrati

					cultivation methods	on 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						
Rastaropsha spotted						
chamomile						
cyanosis blue						
licorice						
Soy scheti-NIST						
uterine horns						
jujube						
cumin sand						
Thymus vulgaris						
bilberry						
Nigella Damascus						
Salvia officinalis						
Rosehip cinnamon						
Dryopteris male						

Zadanie2. 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.

Table 43.

Characteristics of the medicinal plant seeds

The name of the Republic of Lithuania		Description seed		
Ukr .. (growing up).	Lat.	dimensions	surface structure	other
one	2	3	four	five

one	2	3	four	five

Task 3. Based on the analysis of morphological features and information from the scientific literature, make (provided by the scheme) agrorekomendatsii 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 agrorekomendatsii:

Agrorekomendatsii
for cultivation in the Odessa region

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

Biomorfologichny characteristic (f 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, fertilizing, 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 4. 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: _____

9. instructional materials for learning professional skills, skills:

9.1 Method of implementation of the work, stages of implementation:

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 agrorekomendatsy 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 agrorekomendatsii).

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).

10. Materials for self-mastery of knowledge and skills provided by this work.

tests:

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 0C 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.

11. The theme of the next session: -
12.Reference for UDRS and NDRS on the next class

1) To learn the theoretical material on the next topic.

2) Fill in the workbook for the next topic. Fill in all terms

3) To learn the test base Krok scheme

4) independently solve several problems at resursovedeniyu that can be given on the practical part of the complex state examination.

Methodical recommendations were made by ***associate professor Boyko IA***