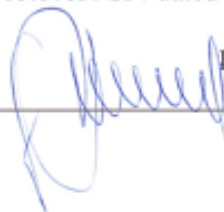


**NATIONAL UNIVERSITY of LIFE and
ENVIRONMENTAL SCIENCES**
Department of Botany, Dendrology and Forest Tree Breeding

«APPROVED» by
Agrobiological
faculty dean


V. Kovalenko
« ____ » _____ 2024

«APPROVED»
at the meeting of the department
of Botany, Dendrology and Forest Tree Breeding
Protocol №14 dated «27th of May» 2024


Head of Department
Y. Marchuk

«REVIEWED»

Guarantor of EP


V. Kovalenko

WORKING PROGRAM OF STUDY PRACTICE

BOTANY

Speciality 201 Agronomy
Educational program Agronomy
Agrobiological faculty
Developer Associate Professor, PhD in Biological Sciences A. Tertyshnyi

KYIV – 2024

Introduction

Purpose of practice: consolidation of knowledge obtained during laboratory-practical classes and lectures.

Tasks of practice: to consolidate the method of morphological analysis of plants, the characteristics of families, to be able to use the identifier and to identify the collected plants.

Competence acquisition:

Integral competence (IC):

The ability to solve complex specialized tasks and practical problems in agronomy, which involves the application of theories and methods of the relevant science and is characterized by the complexity and uncertainty of conditions.

General competences (GC):

GC 1. The ability to realize one's rights and responsibilities as a member of society, to realize the values of a civil (free democratic) society and the need for its sustainable development, the rule of law, the rights and freedoms of a person and a citizen in Ukraine.

GC 3. Ability to abstract thinking, analysis and synthesis.

GC 5. Ability to communicate in a foreign language.

GC 6. Knowledge and understanding of the subject area and understanding of professional activity.

GC 7. Ability to apply knowledge in practical situations.

GC 8. Skills of performing safe activities.

GC 9. Ability to search, process and analyze information from various sources.

GC 11. Efforts to preserve the environment.

Special (professional) competences (SC):

SC 3. Knowledge and understanding of basic biological and agrotechnological concepts, rules and theories related to the cultivation of agricultural and other plants.

SC 5. The ability to evaluate, interpret and synthesize theoretical information and practical, production and research data in the fields of agricultural production. Ability to apply methods of statistical processing of research data related to technological and selection processes in agronomy.

Program learning outcomes (PLO):

PLO 2. Strive for self-organization and self-education.

PLO 5. Conduct a literature search in Ukrainian and foreign languages and analyze the information obtained.

PLO 9. To possess at the operational level, the methods of observation, description, identification, classification, as well as the cultivation of objects and maintaining the stability of agrocenoses with the preservation of natural diversity.

PLO 16. To organize effective and safe working conditions.

Bases of practice: Botanical garden of NUBiP of Ukraine, NPP "Holosiivskyi"

Organization of practice

Duration of educational practice is 15 hours. The educational practice includes days of field work (observational botanical excursions, collection of plants from various types of phytocenoses for the herbarium, laying out plants for drying), and days of classroom work - identification of plants, design of the herbarium, forms of geobotanical descriptions of vegetation.

Content of practice

During fieldwork, students master the following topics.

The first topic: "Plants and the environment" in natural conditions studies the relationship between plants and the environment, the influence of environmental factors on the plant organism and plant cover. Students get acquainted with the life forms of plants and their ecologies: xerophytes,

mesophytes, hygrophytes, hydrophytes, succulents, etc., and also study the floral composition of the forest grass cover in different categories of forest areas (under the forest canopy, on fellings, forestry areas) and ecological cenotic properties of mixed and deciduous forest types with a study of its composition. Students carry out morphological analysis and identification of plants; establishment of accounting plots to determine the nature of the forest grass cover, determination of environmental conditions using indicator plants; geobotanical description of the forest community and at the same time collect plants for a systematic herbarium.

The second topic: "Vegetation of meadows, their geobotanical and economic characteristics."

Under the conditions of completion of the topic, students study the floristic composition of meadows, carry out a geobotanical description of phytocenoses of meadow lands, and select cuttings of vegetation from typical areas. Get acquainted with the cultural and technical measures for improving meadows. Students collect fodder, poisonous, medicinal, honey plants, synanthropic species, soil indicator plants for the herbarium.

The third topic: "Plant resources, their enrichment and protection of rare and endangered plant species and plant communities of Ukraine." On the basis of botanical gardens, collection nurseries, students get acquainted with the variety of plants of Ukraine and other countries of the world, study food, fodder, medicinal, technical, poisonous weeds and other groups of plants.

The fourth topic: "Structure of agrophytocenosis and ecological and coenotic. interrelationships of its price elements". On the basis of educational farms or agrofirms, students get acquainted with the structure of cultural phytocenoses, floristic composition, layering, coverage, vitality of species, phenological, ecological and cenotic properties of cenotypes.

Students carry out a geobotanical description of agrophytocenosis, make and analyze observations on the development of cultivated plants and weeds, and collect a weed herbarium.

The fifth topic: "Vegetation of botanical and geographical zones of Ukraine." During excursions to botanical gardens, students study the vegetation of the botanical and geographical zones of Ukraine.

The sixth topic: "Floristic and coenotic diversity of the plant cover of Ukraine." On the basis of floristic and coenotic analysis, students draw up herbarium material, determine the economic productivity and quality of plant raw materials and, as a result, give proposals for the improvement and enrichment of plant complexes and the transformation of natural lands into various types of agrophytocenoses, taking into account zonal and regional features of ecosystems.

Table 1

Approximate thematic plan

Назва теми	Total number of hours		
	In total	of them	
		auditorium	Selfwork
The first topic: "Plants and the environment"	2	1	1
The second topic: "Vegetation of meadows, their geobotanical and economic characteristics."	2	1	1
The third topic: "Plant resources, their enrichment and protection of rare and endangered plant species and plant communities of Ukraine."	1	0,5	0,5
The fourth topic: "Structure of agrophytocenosis and ecological and coenotic. interrelationships of its price elements"	1	0,5	0,5

The fifth topic: "Vegetation of botanical and geographical zones of Ukraine."	1	0,5	0,5
The sixth topic: "Floristic and coenotic diversity of the plant cover of Ukraine."	1	0,5	0,5
In total	8	4	4

Individual tasks

1. Registration on the inaturalist.org website
2. Conducting observations using inaturalist.org
3. Formation of the catalog of collected flowering plants in accordance with the APGIV system
4. Study of the rare component of the flora.
5. Study of the rare component of vegetation.

Guidelines

Educational practice begins with botanical excursions, during which students study: different types of growth sites, the most important indicators of these types and their adaptability to environmental conditions, as well as indicative and national economic value; rare and endangered species of local flora and measures for their protection. To go on excursions, students must have certain equipment: for the brigade - an excursion folder with a set of newspapers, writing instruments, magnifying glass, tape measure or string, altimeter, measuring rod and fork, sample plot description forms, notebooks for notes, plastic bags, paper for labeling plants, a digger.

During the processing of the collected material in the laboratory, students have the following tasks: to consolidate the method of morphological analysis of plants, the characteristics of families, to be able to use the identifier and to identify the collected plants.

During the internship period, five excursions are held:

1. An excursion to study the plants of the forest cover of coniferous and broad-leaved forests.
2. Excursion to study the geobotanical study of meadow and steppe vegetation.
3. Excursion to study synanthropic species in natural and anthropogenic phytocenoses.
4. Excursions to botanical gardens to study introduced plants.

Approximate thematic plan of excursions (field classes)

Topic name	The base for conducting classes	Number of hours
Study of plants of the forest cover of coniferous and broad-leaved forests	Botanical garden of NUBiP NPP «Holosiivskyi»	2
Study of geobotanical research of meadow and steppe vegetation	Botanical garden of NUBiP NPP «Holosiivskyi»	2
Study of geobotanical research of meadow and steppe vegetation	Botanical garden of NUBiP NPP «Holosiivskyi»	2
Excursion to the botanical garden to study introduced plants.	Botanical garden of NUBiP NPP «Holosiivskyi»	1

Material-technical and educational-methodical support of students' practice

Educational practice begins with botanical excursions, during which students study: different types of growth sites, the most important indicators of these types and their adaptability to environmental conditions, as well as indicative and national economic value; rare and endangered species of local flora and measures for their protection. To go on excursions, students must have certain equipment: for the brigade - an excursion folder with a set of newspapers, writing instruments, magnifying glass,

tape measure or string, altimeter, measuring rod and fork, sample plot description forms, notebooks for notes, plastic bags, paper for labeling plants, a digger. During the processing of the collected material in the laboratory, students have the following tasks: to consolidate the method of morphological analysis of plants, the characteristics of families, to be able to use the identifier and to identify the collected plants.

Requirements for writing a report

Students must submit:

1. Practice diary, where every day of work is recorded: the topic of the excursion, the collected plants, their biological and ecological characteristics.
2. Forms of geobotanical descriptions with the results of conducted research.
3. List of collected plants in the amount of 120 different species, placed in a systematic order (<http://www.mobot.org>).
4. The herbarium of plants is collected and arranged according to the list.
5. Knowledge of Ukrainian and Latin names of plant species and families to which they belong, as well as their economic and indicative significance.

Forms and methods of control

observation of students' educational activities,
oral survey,
written control,
graphic check,
practical control,
test control

Recommended sources of information

1. Simpson M. G. Plant Systematics. 3rd Edition, Academic Press, 2019.
2. Tertyshnyi A.P. Botany. Current system of flowering plants. Part I. Methods handbook for students of the educational degree "Bachelor" of the specialty 201 "Agronomy". Kyiv: Lira-K, 2023. 182 p.
3. Tertyshnyi A.P. Botany. Part 1: tutorial. Kyiv: Lira-K, 2020, 250 p.
4. Tertyshnyi A.P. Botany. Part I (second edition). Study aid. Kyiv: Lira-K, 2024. 742 p.
5. Тертишний А.П. Покритонасінні рослини Лісостепу України. Частина 1: Навчальний посібник. Київ: Видавництво Ліра-К, 2021. 706 с.
6. Тертишний А.П. Покритонасінні рослини Лісостепу України. Частина 2: Навчальний посібник. Київ: Видавництво Ліра-К, 2022. 312 с.
7. Тертишний А.П. Покритонасінні рослини Лісостепу України. Частина 3: Навчальний посібник. Київ: Видавництво Ліра-К, 2023. 758 с.
8. Якубенко Б.Є. Алейніков І.М., Шабарова С.І., Машковська С.П. Ботаніка. Підручник (перевидання). Київ, Видавництво Ліра-К, 2021, 436 с.
9. Якубенко Б.Є., Попович С.Ю., Григорюк І.П., Устименко П.М. Геоботаніка: тлумачний словник. Навчальний посібник. (перевидання), Київ, Ліра-К, 2021, 485 с.

-Internet sources:

Angiosperm phylogeny website_version <http://www.mobot.org/MOBOT/research/APweb/>
Eurasian Dry Grassland Group <https://edgg.org/>
European Vegetation Archive (EVA) <http://euroveg.org/eva-database>
European Vegetation Survey <http://euroveg.org/>
Global Biodiversity Information Facility (GBIF) <https://www.gbif.org>

Global Index of Vegetation-Plot Databases (GIVD) <http://www.givd.info/>
National Biodiversity Information Network <http://ukrbin.com>
National Vegetation Classification (NVC) <https://incc.gov.uk/our-world/nvc/>
Open data about biodiversity <https://www.inaturalist.org>
Society for ecological restoration (SER) <https://www.ser.org/default.aspx>
The Gymnosperm Database <https://www.conifers.org/index.php>
The International Association for Vegetation Science (IAVS) <http://iavs.org/>
The WFO <http://www.worldfloraonline.org/>
Ukrainian geobotanical site <http://geobot.org.ua/>