NATIONAL UNIVERSITY OF LIFE AND ENVIRONMENTAL SCIENCES OF UKRAINE

Faculty Plant protection, biotechnologies and ecology

"APPROVED"
Dean of the Faculty
_____ Kolomietz Y.V.
"23" May, 2024

"APPROVED"
at the meeting of Entomology, integrated pest management and plant quarantine Department

Minutes №.12 of "22" May, 2024__
Head of the Department
_____Dolya M.M.

"REVIEWED"
Guarantor of the AP Crop protection and plant quarintine
_____Pikovskiy M.Y.

CURRICULUM OF ACADEMIC DISCIPLINE
Biological control

Field of knowledge Agrarian sciences and food
Specialty 202 Plant protection and qurintine
Academic programme Plant protection and qurintine
Faculty Plant protection, biotechnologies and ecology

Author(s): Stefanovska T.R., candidate of biological sciences, associate professor

Kyiv- 2024

1. Description of the discipline «Biological control»

(name)

Academic degree, specialty, academic programme		
Academic degree	Bachalor	
Specciality	202 Plant protection and qurintine	
Academic programm	Plant protection and qurintine	
Cource description		
Type	Optional	
Загальна кількість годин	120	
Number of Modules	2	
Research paper	None	
Form of assesment	Exam/credit	
Indicators of the discipline for full-time and part-time forms of university study		
	Regular study	Corresponding study
Study year	4	4
Semester	8	8
Lectures	30	-
Labs	30	
Independent work	30	
Total	120	

2. Aim and objectives of the cource

The aim is to provide bachelors with knowledge about biological methods of integrated plant protection, about the main agents of biocontrol of pests, diseases, and weeds of agricultural crops, as well as familiarization with practical aspects of bioprotection.

Objectives

• To lay the foundations of the student's fundamental training in the field of biological plant protection

• To acquaint students with the peculiarities of the development of beneficial organisms, the habitats of individual phases of their development, phenology and ecology
• To teach students to identify in a timely manner, correctly establish the species affiliation and on the basis of the economic thresholds of harmfulness (ESH) and the level of effectiveness of entomophages (REE)
• Teach students to correctly choose an effective method of biological control of harmful organisms, taking into account the specific phytosanitary condition

As a result of studying the academic discipline, the student must
to know: theoretical and practical bases of plant bioprotection; basic methods of bioprotection; the main types of biocontrol agents and their mechanisms of action; classification, methods and regulations for the use of microbiological biological preparations to control the number of harmful organisms while preserving useful fauna and the environment.

Competence acquisition:
Integral competence. The ability to solve complex specialized tasks and practical problems of professional activity by plant protection and qurintine specialty and to apply theoretical knowledge and methods in production situations characterized by complexity and uncertainty of conditions.
of a bachelor in plant protection and quarantine - the ability to implement educational and social tasks:
General competencies of a bachelor's degree in plant protection and quarantine - the ability to implement educational and social tasks:

GC 3. Ability to communicate in a foreign language, ability to work in a foreign language environment.
GC 7. Ability to learn and master modern knowledge and search, process and analyze information from various sources
GC 9. Ability to make informed decisions.

Special (Professional) competencies of a bachelor's degree in plant protection and quarantine - the ability to perform professional duties by type of professional work:
SC 1. Ability to carry out phytosanitary diagnostics of plant diseases, insects, ticks, nematodes, rodents and weeds according to the latest principles and methods
SC 5. Ability to develop and apply plant protection technologies for agricultural and other purposes.
SC 8. Ability to comprehensively apply methods for long-term regulation, development and spread of pests to an economically insignificant level based on forecasts, economic thresholds of harmfulness, effectiveness of beneficial organisms, energy-saving and environmental technologies that provide reliable

plant protection and environmental safety in accordance with the WTO SPS Agreement and the provisions of the European Union

Expected learning outcomes (ELOs)**:**

ELO 6. Correctly use appropriate methods of observation, description, identification, classification, cultivation of agrobiocenoses and maintenance of their stability to preserve natural diversity

ELO 7. Draw up technological maps for organizing plant protection measures

ELO 15. Realize the value of protecting the independence, territorial integrity and democratic system of Ukraine

2. **Programme and structure of the discipline "Biologicol control"**

Modules and topics	**Number of hours**												
	full-time							**part-time**					
	weeks	total	including					in total	including				
			l	p	lab	ind	s.st		l	p	lab	ind	s.st
1	2	3	4	5	6	7	8	9	10	11	12	13	14
Module 1: **Introduction to biological control**													
Topic 1: State of the art on current biocontrol use and perspectives in Ukraine		16	2		4	10			2		2		
Topic 2: Type of relations between organisms in biocenoses		16	2		4	10			2		2		
Topic 3: Type of strateges in biocontrol		16	2		4	10			1		1		
Topic 4: Review of the main entomophages and acariphages of pests in open and protected field		16	2		4	10			1		1		
Total for module 1	64		18		18	40			6		6		
Module 2: **Microorganisms and their use in biological control**													
Topic 1: General information aboit insect desease		16	2		4	10			1		1		
Topic 2. Title Characterisitc of fungal and viral deseases of insects. Biopesticides produced based on entomopathigenic fungi and viruses		19	36			10							
Topic 3. Use of entomopathogenic nematodes in biocontrol		21	2		4	15							
Total for module 2	56		7		14	35							
Total hours	120		15		30	75							
Total hours	120		15		30		75		8		8		

3. Topics of practical works

№	Topic	Hours
1.	Main orders wher entomophsgues belong to	2
2.	Study of the features of reproduction and development of entomoacarifages	4
3.	Entomophages of polyphagous pests	2
4.	Entomophages of cereal and grain crops' pests	2
5.	Entomophages of legumes	2
6.	Entomophages of technical crops	2
7.	Entomophages of vegetable crops in the open field	2
8.	Entomophages of vegetable and ornamental crops in green house	2
9.	Entomophages of orchards and berries plantations	2
10.	Definition of the main types of trichogramma used in Ukraine	2
11.	Viral based insecticides for biocontrol	2
12.	Bacterial products for biocontrol	2
13.	Microbial products that are based on entomopathogenic and antagonists to disease fungi in biocontrol	2

4. Topics for independent assignments

№ з/п	Topics	Кількість годин
1.	To develop presentation in the format of PPT " Biologicl insecticides of BTU"	6
2.	To analyze the main criteria of trichogram quality control on the example of Cherkasbiozahyst company	6
3.	To make an analytical review of the main parasitic insects produced by the Koppert company and used in the biological protection of plants	6
4.	Analytical review of companies producing and commercillay release Trichograma in Ukraine	6
5.	Ways to activate the activity of entomophages	6
6.	Biologicl methods to control weeds	6

7.	Genetic methid in plant protection	6
8.	Biologicl control. Perspective directiona	6
9.	Utilisation of biofungicydes. Pro and contra	6
10.	The prospect of using biological protection of plants on berry crops	6

5. Means of diagnosing learning outcomes:

- exam
- test
- module tests;
- abstracts;
- calculation and graphic works;
- defense of laboratory and practical works;

6. Teaching methods

- verbal method (lecture, discussion, interview, etc.)
- practical method (laboratory, practical classes);
- visual method (method of illustrations, method of demonstrations);
- work with educational and methodical literature (note-taking, thesis, annotation, reviewing, writing an abstract);
- video method (remote, multimedia, web-based, etc.);
- independent work (completion of tasks);
- individual research work of higher education students.

7. Assesment methods

- exam
- credit;
- oral or written questioning;
- module testing;
- team projects;
- abstracts, essays;
- defense of laboratory and practical work;
- presentations and speeches at scientific events

-work in small groupd

8. Students' performance evaluation

The student's knowledge is assessed on a 100-point scale and translated into national assessments according to Tabl.1."Provisions on examinations and ziliks in NUBiP of Ukraine"

Student raiting points	**National grade based on exam results**	
	Final exams	Credits
90-100	exellent	passed
74-89	good	
60-73	sutisfactory	
0-59	unsutisfactory	not passed

To determine the student's rating for mastering the Rdis discipline (up to 100 points), the obtained rating from the certification (up to 30 points) is added to the student's rating for the RHP academic work (up to 70 points): RDIS = RHP + RHP

9. Educational and methodological support

- electronic training course of the discipline (on the educational portal of NULES of Ukraine eLearn – link **https://elearn.nubip.edu.ua/course/view.php?id=3998**)
- lecture notes and presentations (in electronic form);
- textbooks, manuals, workshops;
- methodological materials for studying the discipline for full-time and part-time students;
- program of educational (industrial) practice of the discipline (if it is provided by the curriculum).

10. Study sources

- Білик М.О. Біологічний захист рослин від шкідливих організмів*:* підручник*;* Харків: Майдан, 2022. 356 стр.

1. Opender Koul, G S Dhaliwal, G W Cuperus. Integrated Pest Management: Potential, Constraints and Challenges CABI Publishing,2004, 329 pp.
2. Gimme H Walter - Insect Pest Management and Ecological Research Cambridge University Press.2023, 300p.
3. Heimpel, G. E., & Mills, N. J. (2017). *Biological control*. Cambridge University Press. Publisher:Cambridge University Press Online ISBN:9781139029117 DOI:https://doi.org/10.1017/9781139029117
4. Jeffers, A., & Chong, J. H. (2021). Biological control strategies in integrated pest management (IPM) programs. Clemson University Cooperative, Land-Grant Press by Clemson Extension, LGP, 1111, 1-9.
5. Hoddle, M. S. (2023). A new paradigm: proactive biological control of invasive insect pests. BioControl, 1-14.