

**MINISTRY OF EDUCATION AND SCIENCE OF UKRAINE
SUMY NATIONAL AGRARIAN UNIVERSITY**

Plant Protection Department named after A.K. Mishnov

APPROVED

Head of Plant Protection

Department named after A.K. Mishnov

_____ Vlasenko V.A.

“ _____ ” _____ 2019

PROGRAM OF THE ACADEMIC DISCIPLINE

Title of the academic discipline: Beneficial entomofauna of agrocenoses and ways of improving its efficiency

Specialty: Postgraduate studies 202 "Plant Protection and Quarantine"

Faculty: Agrotechnology and Environmental Management

2019 – 2020 academic year

Program of the academic discipline "Beneficial Entomofauna of Agroecosystems and Ways of Improving Its Efficiency", for postgraduate students in the specialty 202 "Plant Protection and Quarantine"

Drafters: Head of Plant Protection Department named after A.K. Mishnov, Doctor of Agricultural Sciences, Professor Vlasenko V.A. _____

Associate Professor of Plant Protection Department named after A.K. Mishnova, Candidate of Agricultural Science, Demenko V.M. _____

The program was approved at the meeting of Plant Protection Department named after A.K. Mishnov

Record of May 23, 2019 No. 23

Head of Plant Protection Department named after A.K. Mishnov _____ B.A. Vlasenko

Approved:

Dean of the Faculty of Agrotechnology and nature management _____ I.M. Kovalenko
where the discipline is taught

Dean of the Faculty of Agrotechnology and nature management _____ I.M. Kovalenko
to which the department belongs

Methodist of training department _____ G.O. Baboshina

Registered in electronic database: Date: _____ 2019

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1. Description of the course

Name of indicators	Field of knowledge, training direction, education level	Characteristic of the discipline	
		full-time education	external form of education
Number of credits – 4,0	Field of knowledge: 20 «Agrarian science and foodstuffs»	<i>Selective</i>	
	Postgraduate students of the specialty: 202 «Plant protection and quarantine»		
Modules – 2		Year of preparation:	
Content modules: 4		2019-2020	
		Course	
		2	
		Term	
Total hours – 120		4	
Weekly hours for full-time study: classroom - 8,0 independent work of the student – 2,9	Educational degree: <i>Graduate student (Ph.D.)</i>	Lectures	
		44 hours	
		Practical work	
		44 hours	
		Independent work	
		32 hours	
		Type of control:	
		credit	

Note:

**The ratio of the number of lecture classes to independent work is:
for full-time study – 73,3/26,7 (88/32)**

2. PURPOSE AND TASK OF THE DISCIPLINE

The purpose of the discipline is the acquisition of the third-level higher education applicants of professional and scientific knowledge, abilities, skills for successful implementation of professional and scientific activities on technologies of cultivation and use of beneficial entomofauna of agrocenoses in biological protection of crops against pests.

The task of the discipline is the ability to solve complex problems in the field of professional, including research and innovation activity, which involves a deep rethinking of existing and the creation of new holistic knowledge and professional training in the protection and quarantine of plants for the beneficial entomofauna of agrocenoses and laboratory breeding technology in plant biological protection.

As a result of the study of the discipline, third-level higher education applicants should:

know:

- the main species of multifarious and specialized pests in different crops and perennial crops, as well as their entomophages, which limit the number of pests, the number of vermins and the hosts on which they develop;
- methods for definition and identification of harmful organisms, entomophages, to carry out scientifically phytosanitary diagnostics of insects, mites by mechanisms of control and management of harmful organisms in agrobiocenoses;
- common factors of development and distribution of a complex of harmful organisms and to develop scientifically-based protective measures against widespread and quarantine harmful organisms;
- technological schemes of effective control of a complex of harmful organisms on the basis of regular knowledge and skills in the field of entomology;
- data on outbreaks of regulated pests according to the materials of scientific institutions, as well as electronic geo-information services of EU countries and the world;
- long-term studies on the circulation of harmful organisms with the development of a methodology for the management of harmful organisms at species and population levels at agricultural purpose and non-purpose objects;
- forecast models, complex economic thresholds for phytophage harmfulness, protective action of beneficial organisms, energy-saving and environmental technologies for efficient cultivation of promising varieties and hybrids of crops and organic farming;
- scientifically substantiated complex measures for plant protection and quarantine for enterprises, institutions, organizations of all forms of ownership, the activity of which is connected with the use of land, cultivation of agricultural and other purposes, their implementation, processing, storage and use;
- norms of academic integrity and scientific ethics.

be able to:

- have professional knowledge; formulate ideas and concepts for use in academic or professional work;
- dilute entomophagos and their preys, dilute phytophages, predict changes in the number of insects; analyze the effect of abiotic and biotic factors on insect development; give correct estimation of population size;
- find solutions in plant protection and quarantine, have sufficient competence in independent research methods, be able to interpret their results;
- apply knowledge and training skills in solving specialized problems of plant protection and quarantine;
- analyze the results of studies of morphology, biology, ecology, physiology of harmful organisms and evaluate the significance of indicators;

- participate in professional trainings, discussions on the basis of knowledge on plant protection and quarantine;
- identify, summarize and solve problems that arise in the process of professional activity, and form responsibility for the work performed;
- show positive professional, social and emotional behavior and adapt it to the system of universal values; within the competence to exercise independence and responsibility in work;
- implement national and world standards for plant protection and quarantine, carry out research in accordance with the methods;
- combine a combination of different technological methods of practical research to solve typical professional problems;
- carry out an individual-educational scientific program, self-study;
- use innovative scientific creativity;
- obtain competitive scientific and practical results;
- develop and use state-specific targeted programs for plant protection and quarantine;
- conduct high-quality scientific search, processing, analysis and integration of acquired scientific knowledge.

3. PROGRAM OF THE ACADEMIC DISCIPLINE

MODULE 1. THEORETICAL BASIS OF DILUTION PROCEDURE TECHNOLOGIES OF BENEFICIAL INSECTS. DILUTION PROCEDURE OF PREDATORY MITES, BUGS, COCCINELLIDAE

Content module 1. Theoretical basis of dilution procedure technologies of beneficial insects. Dilution procedure of predatory mites

Theme 1. Theoretical bases of dilution procedure technologies of beneficial insects.

The subject and tasks of the discipline "Beneficial entomofauna of agrocenoses and ways of improving its efficiency". Advantages and disadvantages of biological method. Types of relationships between organisms in biocenoses.

Biological features of entomophages. Biological features of vermins. Biological features of parasites. Features of entomophage reproduction. Types of eggs and types of insect larvae of entomophages. Ways of using entomophages.

Predatory insects, species composition of their preys. Species composition. Features of biology. Predatory stages and the range of preys.

Parasitic insects, species composition of their preys. Species composition. Features of biology. Parasitic stages and host range.

Theoretical bases of dilution procedure technologies of beneficial insects. Factors affecting the efficiency of dilution procedure of beneficial insects. Types of insect dilution procedure technologies (laboratory, semi-industrial and industrial technologies). Insect production in the biotechnocenosis and initial population.

Theme 2. Dilution procedure technologies of the predatory mites Phytoseiidae family.

Species composition of predatory mites. Laboratory dilution procedure of the predatory mite Phytoseiulus. Laboratory dilution procedure of the predatory mite Neoseiulus.

Study biological features and stages of laboratory dilution procedure of the mite Phytoseiulus.

Study biological features and stages of laboratory dilution procedure of the mite Metaseiulus.

Study the species composition, biological features, stages of laboratory dilution procedure of the predatory mites Neoseiulus genus.

Familiarize oneself with the methods of using predatory mites and the range of their preys.

Content module 2. Dilution procedure of predatory bugs, coccinellidae

Theme 3. Dilution procedure technologies of predatory bugs.

Dilution procedure technologies of the predatory Anthocoridae. Species composition of Anthocoridae and Orius genera. Laboratory dilution procedure of Anthocoridae.

Study the species composition and features of biology of the bugs Anthocoridae genus.

Study the species composition and features of biology of the bugs Orius genus.

Study the stages of laboratory dilution procedure of the predatory bugs Anthocoridae.

Familiarize oneself with the ways and conditions of using the bugs Anthocoridae.

Dilution procedure technologies of the predatory bugs Miridae family. Species composition and features of biology of the vermins Miridae family. Laboratory dilution procedure of the bugs Miridae family.

Dilution procedure technologies of the predatory bugs Pentatomidae family. Species composition and features of biology of the vermins Pentatomidae family. Laboratory dilution procedure of the bugs Pentatomidae family.

Study biological features and stages of laboratory dilution procedure of the predatory bugs Miridae and Pentatomidae.

Predacious insects, species composition of their preys.

Theme 4. Dilution procedure technologies of Coccinellidae.

Dilution procedure technologies of the vermins Coccinellidae family. Dilution procedure technologies of Cryptolaemus in laboratories.

Dilution procedure technologies of Cycloneda and Harmonia. Dilution procedure technologies of Cycloneda in laboratories. Dilution procedure technologies of Harmonia in laboratories.

Study the biological features and stages of laboratory dilution procedure of Cryptolaemus and Cycloneda.

Study the biological features and stages of laboratory dilution procedure of Harmonia, Leis and Propylea quatuordecimpunctata.

Biological information about dilution procedure of insect.

MODULE 2. PREDACIOUS AND PARASITIC INSECTS

Content module 3. Dilution procedure of Neuroptera, Diptera, Trichogramma.

Theme 5. Dilution procedure technologies of the predatory insects Neuroptera order.

Dilution procedure technologies of Chrysopidae in laboratories.

Study the biological features and stages of laboratory dilution procedure of the vermins Chrysopidae and Hemerobiidae families.

Dilution procedure technologies of Micromus. Dilution procedure technologies of Micromus in laboratories.

Familiarize oneself with the methods and conditions of use, the range of preys of the predatory Neuroptera

Theme 6. Dilution procedure technologies of the insects Diptera order. Dilution procedure technologies of Aphidoletes aphidimyza in laboratories.

Dilution procedure technologies of Syrphidae. Dilution procedure technologies of Syrphidae in laboratories.

Study insect production in biotechnocenosis and initial population.

Study the biological features and stages of laboratory dilution procedure of the predatory flies Cecidomyiidae and Syrphidae

Theme 7. Dilution procedure technologies of Trichogramma. Features of Trichogramma biology and types of hosts.

Main species and ecotypes of Trichogramma, their biological features.

Laboratory dilution procedure and use of Trichogramma. Laboratory dilution procedure and use of Trichogramma.

Stages of laboratory dilution procedure and use of Trichogramma.

Parasitic insects, species composition of their preys.

Content module 4. Dilution procedure of Hymenoptera

Theme 8. Dilution procedure technologies of the parasites Braconidae family. Features of biology, the hosts range. Laboratory dilution procedure and use of Dacnusiae.

Stages of laboratory dilution procedure of Braconidae Dacnusiae

Stages of laboratory dilution procedure of Braconidae Habrobracon gebetor

Selection of initial material and introduction of biomaterial into technocenosis.

Theme 9. Dilution procedure technologies of the parasites Aphelinidae family. Species composition and host range of the entomophages Aphelinidae family.

Stages of laboratory dilution procedure of the parasites Aphelinus genus

Laboratory dilution procedure and use of Encarsia. Laboratory dilution procedure and use of Encarsia.

Stages of laboratory dilution procedure of Encarsia

Theme 10. Dilution procedure technologies of the parasitic insects Aphidiinae family. Features of biology, the hosts range. Laboratory dilution procedure and use of parasite.

Stages of laboratory dilution procedure of the parasites Lisiphlebus genus.

Technology of laboratory production of bioagents and methods of their use

Theme 11. Dilution procedure technologies of the parasite fly Eulophidae family. Features of biology, the hosts range of Diglyphus isaea. Laboratory dilution procedure and use of the parasite Diglyphus isaea.

Stages of laboratory dilution procedure of Diglyphus isaea.

Selection of food solution and determining the impact on insects of insufficient nutrients in the feed.

4. STRUCTURE OF THE DISCIPLINE

Titles of content modules and themes	Number of hours					
	Full-time education					
	total	l	p	lab	ind	i.w.
1	2	3	4	5	6	7
Module 1. Theoretical basis of dilution procedure technologies of beneficial insects. Dilution procedure of predatory mites, bugs, Coccinellidae						
<i>Content module 1. Theoretical basis of dilution procedure technologies of beneficial insects. Dilution procedure of predatory mites</i>						
Theme 1. Theoretical bases of dilution procedure technologies of beneficial insects	18	10				8
Theme 2. Dilution procedure technologies of the predatory mites Phytoseiidae family	10	2	8			
Total for the content module	28	12	8			8
<i>Content module 2. Dilution procedure of predatory bugs, coccinellidae</i>						
Theme 3. Dilution procedure technologies of predatory bugs	20	6	10			4
Theme 4. Dilution procedure technologies of Coccinellidae	12	4	4			4
Total for the content module 2	32	10	14			8
Total for module 1	60	22	22			16
Module 2. Predacious and parasitic insects						
<i>Content module 3. Dilution procedure of Neuroptera, Diptera, Trichogramma</i>						

Titles of content modules and themes	Number of hours					
	Full-time education					
	total	l	p	lab	ind	i.w.
1	2	3	4	5	6	7
Theme 5. Dilution procedure technologies of the predatory insects Neuroptera order	12	4	4			4
Theme 6. Dilution procedure technologies of Diptera	6	4	2			
Theme 7. Dilution procedure technologies of Trichogramma	12	4	4			4
Total for the content module 3	30	12	10			8
<i>Content module 4. Dilution procedure of Hymenoptera</i>						
Theme 8. Dilution procedure technologies of the parasites Braconidae family	9	2	4			3
Theme 9. Dilution procedure technologies of the parasites Aphelinidae family	8	4	4			
Theme 10. Dilution procedure technologies of the parasitic insects Aphidiinae family	7	2	2			3
Theme 11. Dilution procedure technologies of the parasitic fly Eulophidae family	6	2	2			2
Total for the content module 4	30	10	12			8
Total for module 2	60	22	22			16
Total hours	120	44	44			32

5. Themes and lectures plan

№ 3/П	Title and theme plan	Number of hours
1	Theme 1. The subject and tasks of the discipline "Beneficial entomofauna of agrocenoses and ways of improving its efficiency". 1. The subject and tasks of the discipline. 2. Advantages and disadvantages of the biological method. 3. Types of relationships between organisms in biocenoses. 4. Ways of using entomophages.	2
2	Theme 2. Biological features of entomophages 1. 1. Biological features of vermins. 2. 2. Biological features of parasites. 3. 3. Features of entomophage reproduction. 4. Types of eggs and types of insect larvae of entomophages.	2
3	Theme 3. Predacious insects, species composition of their preys 1. Species composition. Features of biology 2. Predatory stages and the range of preys.	2
4	Theme 4. Parasitic insects, species composition of their preys 1. Species composition. Features of biology. 2. Parasitic stages and the hosts range.	2
5	Theme 5. Theoretical bases of dilution procedure technologies of beneficial insects 1. Factors affecting the efficiency of insect dilution procedure 2. Types of insect dilution procedure technologies.	2
6	Theme 6. Dilution procedure technologies of the mites Phytoseiidae family 1. Species composition of predatory mites.	2

№ 3/П	Title and theme plan	Number of hours
	2. Laboratory dilution procedure of Phytoseiulus and Neoseiulus.	
7	Theme 7. Dilution procedure technologies of the predatory Anthocoridae 1. Species composition of Anthocoridae and Orius genera. 2. Laboratory dilution procedure of Anthocoridae.	2
8	Theme 8. Dilution procedure technologies of the predatory bugs Miridae family 1. Species composition and features of biology of the vermins Miridae family. 2. Laboratory dilution procedure of the bugs Miridae family.	2
9	Theme 9. Dilution procedure technologies of the predatory bugs Pentatomidae family 1. Species composition and features of biology of the vermins Pentatomidae family. 2. Laboratory dilution procedure of the bugs Pentatomidae family.	2
10	Theme 10. Dilution procedure technologies of the vermins Coccinellidae family 1. Dilution procedure technologies of Cryptolaemus in laboratories.	2
11	Theme 11. Dilution procedure technologies of Cycloneda and Harmonia 1. Dilution procedure technologies of Cycloneda in laboratories. 2. Dilution procedure technologies of Harmonia in laboratories.	2
12	Theme 12. Dilution procedure technologies of the predatory insects Neuroptera order 1. Dilution procedure technologies of Chrysopidae in laboratories.	2
13	Theme 13. Dilution procedure technologies of Micromus 1. Dilution procedure technologies of Micromus in laboratories.	2
14	Theme 14. Dilution procedure technologies of the insects Diptera order 1. Dilution procedure technologies of Aphidoletes aphidimyza in laboratories.	2
15	Theme 15. Dilution procedure technologies of Syrphidae 1. Dilution procedure technologies of Syrphidae in laboratories.	2
16	Theme 16. Dilution procedure technologies of Trichogramma 1. Features of Trichogramma biology and types of hosts.	2
17	Theme 17. Laboratory dilution procedure and use of Trichogramma 1. Laboratory dilution procedure and use of Trichogramma.	2
18	Theme 18. Dilution procedure technologies of the parasites Braconidae family 1. Features of biology, the hosts range. 2. Laboratory dilution procedure and use of Dacnusiae.	2
19	Theme 19. Dilution procedure technologies of the parasites Aphelinidae family 1. Species composition and host range of entomophages of Aphelinidae family.	2
20	Theme 20. Laboratory dilution procedure and use of Encarsia 1. Laboratory dilution procedure and use of Encarsia.	2
21	Theme 21. Dilution procedure technologies of the parasitic insects Aphidiinae family 1. Features of biology, the hosts range. 2. Laboratory dilution procedure and use of parasite.	2

№ 3/Π	Title and theme plan	Number of hours
22	Theme 22. Dilution procedure technologies of the parasitic fly Eulophidae family 1. Features of biology, the hosts range of Diglyphus isaea. 2. Laboratory dilution procedure and use of the parasite Diglyphus isaea.	2
	Total	44

6. Themes and plan of practical classes

№ 3/Π	Theme title	Number of hours
1	Theme 1. Study the biological features and stages of laboratory dilution procedure of the mite Phytoseiulus	2
2	Theme 2. Study the biological features and stages of laboratory dilution procedure of the mites Metaceiulus	2
3	Theme 3. Study the species composition, biological features, stages of laboratory dilution procedure of the predatory mites Neoseiulus genus	2
4	Theme 4. Familiarize oneself with the methods of using predatory mites and the range of their preys	2
5	Theme 5. Study the species composition and features of biology of the bugs Anthocoridae genus	2
6	Theme 6. Study the species composition and features of biology of the bugs Orius genus	2
7	Theme 7. Study the stages of laboratory dilution procedure of the predatory bugs Anthocoridae	2
8	Theme 8. Familiarize oneself with the ways and conditions of using bugs Anthocoridae	2
9	Theme 9. Study the biological features and stages of laboratory dilution procedure of the predatory bugs Miridae and Pentatomidae	2
10	Theme 10. Study the biological features and stages of laboratory dilution procedure of Cryptolaemus and Cycloneda	2
11	Theme 11. Study the biological features and stages of laboratory dilution procedure of Harmonia, Leis and Propylea quatuordecimpunctata	2
12	Theme 12. Familiarize oneself with the methods and conditions of use, the range of preys of the predatory Neuroptera	2
13	Theme 13. Study the biological features and stages of laboratory dilution procedure of the vermins Chrysopidae and Hemerobioidea families	2
14	Theme 14. Study the biological features and stages of laboratory dilution procedure of the predatory flies Cecidomyiidae and Syrphidae	2
15	Theme 15. The main species and ecotypes of Trichogramma, their biological features	2
16	Theme 16. Stages of laboratory dilution procedure and use of Trichogramma	2
17	Theme 17. Stages of laboratory dilution procedure of Braconidae Dacnusinginae	2
18	Theme 18. Stages of laboratory dilution procedure of Braconidae Habrobracon gebetor	2
19	Theme 19. Stages of laboratory dilution procedure of the parasites Aphelinus genus	2
20	Theme 20. Stages of laboratory dilution procedure of Encarsia	2
21	Theme 21. Stages of laboratory dilution procedure of the parasites Lisiphlebus genus	2
22	Theme 22. Stages of laboratory dilution procedure of Diglyphus isaea the	2

	parasite of Eulophid family	
	Total	44

7. Independent work

№ 3/II	Theme title	Number of hours
1	Types of relationships between organisms in biocenoses.	4
2	Features of entomophage reproduction. Ways of using entomophages	4
3	Predaceous insects, species composition of their preys.	4
4	Biological information about insect dilution procedure.	4
5	Study insect production in biotechnocenosis and initial population.	4
6	Parasitic insects, the species composition of their preys.	4
7	Selection of initial material and introduction of biomaterial into technocenosis.	3
8	Technology of laboratory production of bioagents and methods of their use	3
9	Selection of food solution and determining the impact on insects of insufficient nutrients in the feed.	2
	Total	32

8. TEACHING METHODS

1. Learning methods for the source of knowledge:

- 1.1. Verbal: story, explanation, conversation (heuristic and reproductive), lecture,
- 1.2. Visual: demonstration, illustration, observation.
- 1.3. Practical: laboratory method.

2. Methods of learning by the nature of the logic of cognition.

- 2.1. Analytical.
- 2.2. Methods of synthesis.

3. Methods of teaching by the nature and level of students' independent mental activity.

- 3.1. Problem (problem-information).
- 3.2. Partial search (heuristic).
- 3.3. Personalized learning;
- 3.4. Individual training.

4. Active teaching methods - use of technical training tools, use of problem situations, imitation training methods (built on imitation of future professional activity), use of training and control tests), report, presentation.

5. Interactive learning technologies - use of multimedia technologies.

9. CONTROL METHODS

1. Rating control over a 100-points ECTS rating scale
2. Conducting intermediate control during the semester (intermediate certification)
3. Multicriteria evaluation of the current work of third-level higher educational applicants:
 - results of implementation and protection of practical works;
 - express control during classes;
 - self-study of the topic as a whole or individual issues;
 - writing abstracts;
 - test results;
 - written tasks in the course of control work;
 - evaluation by a group of lecturers.

10. Distribution of points received by post-graduate students

Ongoing testing and independent work												Independent work	Together for modules and independent	Certification	Total
Module 1 – 35 points				Module 2 – 35 points											
Content module 1 – 17 points		Content module 2 – 18 points		Content module 3 – 17 points			Content module 4 – 18 points								
T1	T2	T3	T4	T5	T6	T7	T8	T9	T10	T11		15	85	15	100
8	9	9	9	6	5	6	5	5	4	4		(70+15)			

Rating scale: national and ECTS

Sum of points for all kinds of academic activity	Grade ECTS	Rating on a national scale	
		for exam, term paper, practice	for credit
90 – 100	A	excellent	credit
82 - 89	B	good	
75 - 81	C		
69 - 74	D	satisfactory	
60 - 68	E		
35 - 59	FX	unsatisfactory with the possibility of re-examination	No credit with the possibility of retake
1 - 34	F	unsatisfactory with the compulsory re-study of the discipline	No credit with the compulsory re-study of the discipline

11. METHODOLOGICAL SUPPORT

1. Program of the academic discipline.
2. Information and educational support for all participants of the educational process is provided through the website of Sumy National Agrarian University (<https://snau.edu.ua/>), which contains information about educational programs, educational, scientific and educational activities, structural units, contacts, repository, research libraries and reading rooms, etc.
3. Vlasenko V.A., Sarbash V.M. Slovnýk terminiv z biologichnogo zaxy`stu rosly`n dlya studentiv 4 kursu z napryamu 6.010905 «Zaxy`st rosly`n» dennoyi ta zaochnoyi formy` navchannya. /navchal`ny`j posibny`k / Rekomend. do vy`d. vch. rad. Navchal`no–naukovogo inzhenerno – texnolog. in-tu SNAU. Protokol # 9 vid «22» travnya 2012 roku. – Sumy`: Sums`ky`j NAU, 2012. – 54 s.

12. RECOMMENDED BOOKS

Basic

1. Biologichny`j zaxy`st rosly`n / Dyadechko M. P., Padij M. M., Shelestova V. S. ta in.; za red. M. P. Dyadechka ta M. M. Padiya. Bila Cerква, 2001. 312 s.
2. Bry`gady`renko V.V. Osnovy` sy`stematy`ky` komax: Navch. posib. D.: RVV DNU, 2003. 204 s.
3. Brovdij V.M., Gulij V.V., Fedorenko V.P. Biologichny`j zaxy`st rosly`n. K., 2004. 351 s.

4. Vredy`tely` sel`skoxozyajstvenny`x kul`tur y` lesny`x nasadzheny`j / [Antonyuk S. Y., Areshny`kov B.A., Bajdashny`kov A.A. y` dr.]; pod red. V. P. Vasy`l`eva. K.: Urozhaj, 1987. 440 s.
5. Gadzalo Ya. M. Shkidny`ky` yagidny`x kul`tur na Polissi ta v Lisostepu Ukrayiny`. K. : Urozhaj, 1999. 80 s.
6. Demenko V. M., Yemecz` O. M. Entomologiya: navchal`ny`j posibny`k. Sumy`: SNAU, 2019. 440 s.
7. Dovidny`k iz zaxy`stu rosly`n / [Bubly`k L. I., Vasechko G. I., Vasy`l`yev V. P. ta in.]; za red. M. P. Lisovogo. K.: Urozhaj, 1999. 774 s.
8. Dudny`k A. V. Sil`s`kogospodars`ka entomologiya : navchal`ny`j posibny`k. My`kolayiv : MDAU, 2011. 389 s.
9. Yermolenko V. M. Atlas komax - shkidny`kiv pol`ovy`x kul`tur. K.: Urozhaj, 1984.128 s.
10. Movchan O. M. Karanty`nni shkidly`vi organizmy`. Chasty`na 1. Karanty`nni shkidny`ky`. K.: Svit, 2002. 288 s.
11. Naukovo-obg`runtovana sy`stema vedennya sil`s`kogo gospodarstva Sums`koyi oblasti. Sumy`: VAT "SAD", vy`davny`cztvo "Kozacz`ky`j val", 2004. 662 s.
12. Opty`mizaciya integrovanogo zaxy`stu pol`ovy`x kul`tur : Dovidny`k / [Yu. G. Krasyl`ovecz`, V. S. Zuza, V. P. Petrenkova, V. V. Ky`ry`chenko ta in.] ; za red. V. V. Ky`ry`chenka, Yu. G. Krasyl`ovcya. Xarkiv : Magda LTD, 2006. 252 s.
13. Osmolovsky`j G.E. Opredely`tel` s.-x. vredy`telej po povrezhdeny`yam kul`turny`x rasteny`j. M.: Kolos, 1976. 696 s.
14. Perelik pesty`cy`div i agroximikativ, dozvoleny`x do vy`kory`stannya v Ukrayini . K.: YUNIVEST MEDIA, 2018. 1040 s.
15. Ruban M. B., Gadzalo Ya. M. Prakty`kum iz sil`s`kogospodars`koyi entomologiyi : navch. posib. za red. M. B. Rubana. K. Aristej, 2009. 472 s.
16. Ruban M. B., Gadzalo Ya. M., Bobos` I. M. Shkidny`ky` ovochevy`x i plodovo-yagidny`x kul`tur ta zaxy`stu vid ny`x : navch. posib. dlya agrar. vy`shh. zakladiv I-IV rivniv akredy`tacyi z napryamu «Agronomiya». K.: Urozhaj, 2004. 264 s.
17. Savkovs`ky`j P. P. Atlas vredy`telej plodovy`x y` yagodny`x kul`tur. K.: Urozhaj, 1983. 204 s.
18. Sil`s`kogospodars`ka entomologiya. Prakty`kum. / [Demenko V. M., Vlasenko V. A., Yemecz` O. M., Os`machko O.M.], za red. V. M. Demenka. Sumy`, SNAU, 2016. 103 s.
19. Sil`s`kogospodars`ka entomologiya / [Ruban M. B., Gadzalo Ya. M., Bobos` I. M. ta in.]; za red. M. B. Rubana. K.: Aristej, 2007. 520 s.
20. Supixanov B. M., Levchenko V. I.ë Ivchenko V. M., Mishn`ov A. K., Kabanecz` V. M., Demenko V. M. Karanty`nni shkidny`ky` ta xvoroby` rosly`n. VAT „SOD”, Kozacz`ky`j val, 2004. 184 s.
21. Fedorenko V. P., Pokozij J. T., Krut` M. V. Entomologiya: Pidruchny`k ; za red. akademika V. P. Fedorenka. K. Feniks, Kolobig, 2013. 344 s.
22. Fedorenko V.P. Strategiya i takty`ka zaxy`stu rosly`n. Tom 1. Strategiya. Monografiya. K.: Al`fa-Steviya, 2012. 500 s.
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13. Information resources

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