Federal State Autonomous Educational Institution of Higher Education
«RUDN University»

Agrarian and Technological Institute
Recommended by ISSC

WORKING PROGRAM OF THE DISCIPLINE

Biopesticides

Recommended for the direction of training/specialty

35.06.01 «Agriculture»

Program Profile 06.01.07 «Plant Protection»

PhD Program

1. Goals and objectives of the discipline:

The aim of the course is to familiarize with the possibilities and methods of practical use of natural regulators of the development of populations of pests, pathogens and weeds.

To achieve this goal in the course of teaching the course, the following tasks are solved:

- study of modern means of biological protection of plants from a complex of pests, diseases and weeds;
- familiarization with the methods of obtaining biological products for various purposes;
- mastering the methods of cultivating useful species on artificial nutrient media;
- study of the features of the biological method of plant protection in open and protected ground

2. Place of discipline in the structure of GPC BO:

"Biopesticides" refers to the variable part of the general scientific cycle of disciplines of the master's specialization "Integrated plant protection" and "Management in production technologies, processing and standardization of crop products." The study of the discipline "Organization of integrated plant protection systems" is largely based on the knowledge gained during the development of such previous disciplines as "Bacterial plant diseases", "Plant quarantine", "Biological method of plant protection"

3. Requirements for the results of mastering the discipline:

The process of studying the discipline is aimed at the formation of the following **competencies**:

GC-5 – the ability to use in practice the skills and abilities in the organization of research and design work

GPC-3 – the ability to understand the essence of modern problems of agronomy, scientific and technical policy in the field of production of safe crop products

GPC-4 – possession of methods for assessing the state of agrophytocenoses and methods for correcting the technology of cultivation of agricultural crops in various weather conditions

PC-1 – readiness to use modern achievements of world science and advanced technology in research projects

GC-2 – the ability to substantiate research tasks, choose methods of experimental work, interpret and present the results of scientific experiments

GC-3 – the ability to independently organize and conduct scientific research using modern methods of analysis of soil and plant samples

GC-5 willingness to present results in the form of reports, abstracts, publications and public discussions

As a result of studying the discipline, the PhD student must:

Know:

1. Regularities of the formation of phytopathogenic entomofauna;
2. patterns of occurrence and development of epiphytoties;
3. the influence of individual environmental factors on the dynamics of populations of phytopathogens;
4. directions of adaptation of pests

To be able to:

5. Determine the phase of the dynamics of the population of phytopathogens;
6. to assess the influence of various environmental factors on intra- and interpopulation relations within the phytopathogenic complex;
7. determine economic thresholds of harmfulness and use them when building a system of protective measures

Own*:*

8. Building skills and methods for assessing the effectiveness of a complex of protective measures on various crops rules for working with software packages Microsoft Office Excel, Microsoft Office PowerPoint

4. The scope of the discipline and types of educational work

The total workload of the discipline is 4 credit units.

Type of educational work	Total hours	Semesters			
		1	2	3	4
Classroom Lessons (Total)	80				80
Including:	-		-	-	-
Lectures	40				40
Practical lessons (PL)	40				40
Seminars (S)					
Laboratory work (LW)					
Independent work (Total)	37				37
Control	27				27
Total work rendered hrs	144				144
units.	4				4

5. Content of the discipline

5.1. Contents of discipline sections

№	Name of the discipline section	Section content (topics)
1	The history of development and the current state of the	The main factors in the regulation of the number of harmful organisms. Ecological foundations of the bio-method. Forms of relationships between organisms in biocenoses.

	biological method of plant protection	
2	The main groups of natural pest parasites. Disease and weed pathogens	Viruses as pathogens of pests and rodents. Bacterial, fungal, nematode and protozoal pest diseases. Microorganisms - antagonists and hyperparasites of pathogens. Biological method of weed control
3	Entomophages	Methods of using entomophages. Trichogramma, gabrobragon, encarsia, sirfids, rhodolia
4	Acarifages	Fitoseyulus. Ambiseyulus
5	Phytophages	Prospects for use. Phytomiza
6	Genetic insect control methods	Sterilization methods. Chemosterilants. Application methods and conditions
7	Production technology and methods for monitoring the effectiveness of biological products	Biopesticides; biologically active substances in plant protection. Terms of use; efficiency; environmental friendliness

5.2. Разделы дисциплин и виды занятий

№	Name of the discipline section	Lec.	Practicum	Lab work	Seminar	Control	Total Hours
1	The concept of biological plant protection, the main goals and objectives	2	2			7	11
2	The main groups of natural pest parasites. Disease and weed pathogens	6	6			10	22
3	Entomophages	4	4			7	15
4	Acarifages	4	4			7	15
5	Phytophages	6	6			7	19
6	Genetic insect control methods	4	4			9	17
7	Production technology and methods for monitoring the effectiveness of biological products	4	4			7	15

6. Material and technical support of the discipline: Laboratory of phytopathology, laboratory of entomology, laboratory of plant immunity, laboratory of phytopathogen diagnostics, illustrative material, handouts, multimedia complex.

7. Information support of the discipline

a) Software

- Windows 7 Corporate.
- Microsoft Office.
- Adobe Acrobat.
- Visual tabular material.

b) Databases, reference and search systems:

1.. Genome-wide approaches to functional analysis of repetitive elements: http://dis.podelise.ru/text/index-26556.html

2. Background information on molecular diagnostics at the free encyclopedia Wikipedia https://ru.wikipedia.org/wiki

3. Географическая информационная система «Агроэкологический атлас России и сопредельных стран: экологически значимые растения, их болезни, вредители и сорные растения» http://www.agroatlas.ru/ru/

4. Molecular diagnostic methods for potato diseases: http://agrokorenevo.ru/metody_molekulyarnoy_diagnostiki_bo

5. Website of the International Society of PHYTOPATHOLOGISTS InernationalSocietyforPlantPathology http://www.isppweb.org/

6. Reference site for potato breeding and protection www.kartofel.org

7.URL: http://biblioclub.ru/index.php?page=book&id=143079. Date of the application 25.11.2014.

8.www.binran.ru

9.www.elibrary.ru

10.www.diclib.com

11.www.lomonosov-fund.ru

University library online: http://www.biblioclub.ru

1. 1. National digital resource "RUKONT”": http://rucont.ru
2. IQlib: http://www.iqlib.ru
3. ScienceDirect: http://www.sciencedirect.com
4. Sage Publications:http://online.sagepub.com
5. Web of Science: http://www.isiknowledge. com
6. University information system RUSSIA: http://www.cir.ru/index.jsp
7. Educational portal of RUDN University: http://web-local.rudn.ru/

Consultant http://www.studmedlib.ru

8. Educational and methodological support of the disciplinea):

a) Main Literature

1. Чулкина В.А.и др. Экологические основы интегрированной защиты растений, М.: Колос, 568с.

2. Фадеев Ю.Н.. Новожилов К.В. Интегрированная защита растений, М.: Колос, 1991.355с.

b) Additional Literature

1. Защита растений от болезней. Под рад. Шкаликова В.А., Москва. Изд-во «Колос», 2001

2. Защита растений от вредителей. Под рад. Исаичева В.В., Москва. Изд-во «Колос», 2001

c) databases, reference and search systems

1. http://bvi.rusf.ru/sista/alf_1047.htm

2. www.cnshb.ru

10. Educational and methodological support of the discipline:

11. Methodical instructions for students on mastering the discipline (module)

Postgruate students must observe discipline, come to classes on time, submit homework for testing, prepare for the test and control work provided for in the course, be active in the classroom. An important place in the educational process is occupied by the independent work of graduate students. To organize independent work on the course, modern information technologies are used: online complexes of educational and teaching materials (program, list of recommended literature and information resources, tasks for self-control), free access to the Internet for working with databases. As part of independent work, students prepare a patent application or a Scopus / WoS article.

Semester work

Job type	Number of tasks	No. of points	Total points
Writing a review article	1	50	50
Seminar work, homework, presentation	6	5	30
Final certification (exam)	1	20	20
TOTAL (maximum points)			100

Features of the implementation of discipline for people with disabilities and people with disabilities. Training in the discipline of disabled people and persons with disabilities (hereinafter HIA) is carried out by the teacher, considering the characteristics of psychophysical development, individual capabilities and health status of such students. For students with musculoskeletal disorders and hearing disabilities, lectures will be accompanied by multimedia tools and handouts.

For students with visual disabilities, the use of technical means for enhancing residual vision is provided, and the possibility of developing audio materials is also provided.In this discipline, training for disabled people and people with disabilities can be carried out both in the classroom and remotely using the capabilities of the electronic educational environment (TUIS) and e-mail.

In the course of classroom training, various means of interactive learning are used, including group discussions, brainstorming, business games, project work in small groups, which makes it possible to include all participants in the educational process in active work on mastering the discipline. Such teaching methods are aimed at teamwork, discussion, group decision-making, contribute to group cohesion and provide opportunities for communication not only with the teacher, but also with other students, cooperation in the process of cognitive activity. Training of disabled people and persons with disabilities can be carried out according to an approved individual schedule, taking into account the characteristics of their psychophysical development and health status, which implies the individualization of the content, methods, pace of the student's learning activity, the ability to follow the specific actions of the student when solving specific problems, making the need, the required adjustments in the training process.

It provides for individual consultations (including counseling via e-mail), the provision of additional educational and methodological materials (depending on the diagnosis).

12. Fund of assessment tools for intermediate certification of students by discipline (module)

Materials for assessing the level of mastering the educational material of the discipline "Modern methods of diagnostics of pests" (evaluation materials), including a list of competencies indicating the stages of their formation, description of indicators and criteria for assessing competencies at various stages of their formation, description of assessment scales, standard control tasks or other materials necessary for assessing knowledge, skills, skills and (or) experience of activity, characterizing the stages of the formation of competencies in the process of mastering the educational program, methodological materials that determine the procedures for assessing knowledge, skills, skills and (or) experience of activities that characterize the stages of formation competencies are developed in full and are available for students on the discipline page at TUIS RUDN.The program was drawn up in accordance with the requirements of RUDN University.

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