Документ подписан простой электронной подписью
Информация о владельце:
ФИО: Ястребов Олег Александрович
Должность: Ректор
Дата подписания: 19.05.2023 12:25:31
Уникальный программный ключ:
ca953a0120d891083f939673078ef1a989dae18a

Federal State Autonomous Educational Institution of Higher Education
PEOPLES' FRIENDSHIP UNIVERSITY OF RUSSIA
NAMED AFTER PATRICE LUMUMBA
RUDN University

Agrarian-Technological Institute

educational division (faculty/institute/academy) as higher education programme developer

COURSE SYLLABUS

Nematodes

course title

Recommended by the Didactic Council for the Education Field of:

35.04.04 Agronomy

field of studies / speciality code and title

The course instruction is implemented within the professional education programme of higher education:

Integrated Plant Protection

higher education programme profile/specialisation title

2023

1. THE PURPOSE OF MASTERING THE DISCIPLINE

The purpose of mastering the discipline " Nematodes " is to familiarize with the features of the structure, physiology and genetics of bacteria, the principles of their classification, the symptoms of plant lesions. Mastering methods for isolating pathogens from plant tissue into pure culture, calculating their harmfulness and the amount of economic damage. Evaluation of integrated control techniques used in the fight against nematodes.

2. REQUIREMENTS FOR THE RESULTS OF MASTERING THE DISCIPLINE

Mastering the discipline "Nematodes" is aimed at the formation of the following competencies (parts of competencies) among students:

Table 1 - The list of competencies formed by students during the development of the discipline (the results of mastering the discipline)

OPK-1.2; OPK-4.2; PC-4.5; PC-4.6; PC-7.1; PC-7.2

Code	Competence	Competency Achievement Indicators
OPK-1	Able to solve the problems of development of the field of professional activity and (or) organization on the basis of analysis of the achievements of science and production	OPK-1.2 Uses methods of solving problems in the development of agronomy based on the search and analysis of modern achievements of science and production
OPK-4	Able to conduct research, analyze results and prepare reporting documents	OPK-4.2 Uses information resources, scientific, experimental and instrumental base for research in agronomy
OPK-5	Capable of participating in experimental research in professional activities	OPK-5.1 Participates in experimental research in the field of plant protection under the guidance of a higherly qualified specialist
		OPK-5.2 Uses classical and modern research methods in plant protection
PK-1	Ready to participate in agronomic research, statistical processing of	PK-1.1 Defines, under the guidance of a higherly qualified specialist, research objects

	experimental results, formulation of conclusions	and uses modern laboratory, vegetation and field research methods in agronomy
PK-6	Able to consult on innovative technologies in agronomy	PC-6.1. Able to work with information systems and databases on agricultural production management
		PK-6.2. Able to aggregate the need to use plant protection technologies for accelerated development of agricultural enterprises
PK-7	Able to carry out phytosanitary control at the state border in order to protect the territory of the Russian Federation from the penetration of quarantine and other dangerous pathogens and plant pests, weeds	PC-7.1 Recognizes quarantine objects and identifies quarantine pests and pathogens
		PC-7.2 Conducts examination of crops and crop products for the presence of quarantine facilities

3. THE PLACE OF DISCIPLINE IN THE STRUCTURE OF THE OP VO

The discipline "NEMATODE DISEASES" refers to the mandatory part of block B1 op VO.

Within the framework of the OP HE, students also master other disciplines and / or practices that contribute to the achievement of the planned results of the development of the discipline "NEMATODE DISEASES".

Table 2 – List of components of the HE OP that contribute to the achievement of the planned results of the discipline

Code	**Competence**	**Previous disciplines/modules, practices**	**Subsequent disciplines/modules, practices**
OPK-1	Able to solve typical problems of professional activity on the basis of knowledge of the basic laws of mathematical and natural sciences with the use of information and communication technologies	History and methodology of scientific agronomy Information Technologies Instrumental research methods	Work experience

OPK-4	Able to implement modern technologies and justify their use in professional activities	History and methodology of scientific agronomy Information Technologies Instrumental research methods	Plant Growing, Crop Production Practice, Production Practice
OPK-5	Capable of participating in experimental research in professional activities	Agriculture, History and Methodology of Scientific Agronomy Information Technologies Instrumental research methods	Plant Growing, Plant Growing Practice, Fundamentals of Scientific Research in Agronomy, Production Practice
PK-1	Ready to participate in agronomic research, statistical processing of experimental results, formulation of conclusions	Agriculture, History and Methodology of Scientific Agronomy Information Technologies Instrumental research methods	Crop production, Fundamentals of scientific research in agronomy, Production practice, Pre-diploma practice
PK-7	Able to develop fertilizer application systems taking into account soil properties and biological characteristics of plants	Soil science with the basics of geology	Crop
PK-11	Able to determine the total need for seed and planting material, fertilizers and pesticides	-	Crop
PK-12	Able to control the implementation of the technological process of crop production	Agriculture	Crop

4. THE SCOPE OF DISCIPLINE AND TYPES OF EDUCATIONAL WORK

The total labor intensity of the discipline "Nematode diseases" is 3 credit units (108 hours) for full-time education.

Table 3 – Types of educational work by periods of mastery of OP HE for full-time education

Type of educational work		**Total, aca. hrs.**	**Semesters**	
			5	**6**
Contact work		60	60	-
including:				
Lectures (LC)		17	17	-
Laboratory works (LR)		17	17	-
Practical/Seminar Classes (FPs)		–	–	–
Independent work of students		48	48	-
Control (exam/test with grade)		26	26	-
Overall labor intensity of the discipline	aca. hrs.	**108**	**108**	**-**
	Zach. Units.	3	3	-

5. CONTENTS

Table 4 – Content of the discipline (module) by types of educational work

Name of the discipline section	**Contents**	**Type of educational work**
Section 1. The main stages of the development of phytonematology	Topic 1.1. History of the development and formation of science. Topic 1.2. Systematics of nematodes by lifestyle, morphological and genetic signs. Methods of penetration of nematodes into plants and damage to plants, symptoms of damage. Topic 1.3. Plant resistance to nematodes and the factors that determine it. Topic 1.4. The relationship between nematodes and plant pathogens. Topic 1.5. The economic significance of nematode diseases: the economic consequences of the defeat of crops, a decrease in the quantity and quality of the harvest of cultivated plants.	LC
Section 2. Origin and evolution of nematodes, withthe istematics of phytoparasitic nematodes	Topic 2.1. Niche habitats of various groups of bacteria. Topic 2.2. Morphological and anatomical features of the structure of phytonematodes Topic 2.3. Taxonomy of nematodes, based on morphological features and DNA analysis,	LR, LC
Section 3. Harmfulness and economic significance	Topic 3.1. Distribution of nematodes Topic 3.2. Economic harmfulness of nematodes	LR, LC

Section 4. Biology and Ecology of Phytonematodes	Topic 4.1. Breeding cycles of major groups of nematodes Topic 4. 2. Influence on the spread of nematodes of climatic factors, physical and chemical soil factors; Topic 4. 3. Influence of antagonistic microflora and microfauna: predatory fungi and pathogens of nematodes.	LR, LC
Section 5. Features of the interaction of nematodes and plants	Topic 5. 1. Interaction of nematodes with the host plant: free-living and parasiticspecies, Topic 5.2. Inthe survival of nematodes in the soil, spread with seeds.	LR, LC
Section 6. Characteristics of the main families of phytoparasitic nematodes.	Topic 6.1. Families *Aphelenchidae* and *Aphelenchoididae*	
	Topic 6.2. Family *Ditylenchidae*	
	Topic 6.3. Family *Anguinidae*	
	Topic 6. 4. Nematodes - parasites of the root system of plants: Family Hoplolaimidae; Telotylenchidae; Pratylenchidae; Nacobbidae; Tylenchulidae; Heteroderidae; Meloidogynidae; Genus Globodera; Genus Heterodera	
	Topic 6. 5. Nematodes - carriers of viruses and bacteria	
	Topic 6.6. Quarantine phytoparasitic nematodes	
Section 7. Methods of control of phytoparasytic nematodes	Topic 7.1. Examination of soil, plants, seeds and planting material for contamination. Topic 7.2. Methods of nematode isolation. Topic 7.3. Practical diagnosticsbased on phenotypic traits and DNA. Topic 7.4. Preventive, quarantine, phytosanitary, agrotechnical and exterminatory (biological, physical and chemical methods) measures.	

6. MATERIAL AND TECHNICAL SUPPORT OF DISCIPLINE

Table 5 – Discipline Logistics

Audience type	Equipping the classroom	Specialized educational/laboratory equipment, software and materials for mastering the discipline
Lecture Hall	Auditorium for lecture-type classes, equipped with a set of specialized furniture; whiteboard (screen) and technical means of multimedia presentations.	
Laboratory	An auditorium for laboratory work, individual consultations, current control and intermediate certification, equipped with a set of specialized furniture and equipment.	List of specialized laboratory equipment, installations, stands, etc.
For independent work of students	An auditorium for independent work of students (can be used for seminars and consultations), equipped with a set of specialized furniture and computers with access to EIOS.	

7. EDUCATIONAL, METHODOLOGICAL AND INFORMATION SUPPORT OFTHE DISCIPLINE

Main literature:

1. *Bondarenko N.V., Guskova L.A., Pegelman S.G.* Harmful nematodes, ticks, rodents: A textbookfor students of the SKhI on special. "Plant Protection". – M.: Kolos, 1993. – 271 p.
2. *Weisher B., Brown D.D.F.* Acquaintance with Nematodes: General Nematology: Educational for Students. – Sofia; Moscow: Pensoft, 2001. – 206 p.
3. *Danilov L.G.* Development and practical use of biological preparations based on entomopathogenic nematodes for plant protection // Theoretical foundations of the development of biological plant protection products, new selected forms of useful organisms, technologies for the manufacture of biological plant protection products and their use. – M.: Ros. Academy of AgriculturalSciences. Department of Plant Protection, 2004. – P. 32-49.
4. *Dekker H.* Nematodes of plants and the fight against them. – M.: Kolos, 1972. – 444 p.
5. *Zinovieva S.V.* Molecular mechanisms of interaction between plants and parasitic nematodes: theoretical and applied aspects // Parasitic nematodes of plants and insects. – M.: Nauka, 2004. – P. 50-85.
6. *Kiryanova E.S., Krall E.L.* Parasitic nematodes of plants and measures to combat them. – Vol.

1. – Leningrad: Nauka, 1969.

7. Parasitic nematodes of plants and insects / Otv. ed. M.D. Sonin. – M.: Nauka, 2004. – 320 p.
8. *Paramonov A.A.* Basics of Phytohelminthology. – T. I. – M., 1962; VOL. II. – M., 1964; T.

III. – M., 1970.

9. *Pokrovskaya T.V.* Meloidoginosis and the fight against gall nematodes. – M.: Nauka, 1988. – 111 p.

10. Applied nematology. – M: Nauka, 2006. – 350 p.

Resources of the information and telecommunication network "Internet":

1. RUDN University EBS and third-party EBS, to which university students have access on the basisof concluded contracts:

– Electronic library system RUDN University – EBS RUDN Universityhttp://lib.rudn.ru/MegaPro/Web

– EBS "University Library Online" http://www.biblioclub.ru

- EBS Jurait http://www.biblio-online.ru

– EBS "Student Consultant" www.studentlibrary.ru

- EBS "Lan" http://e.lanbook.com/

- EBS "Trinity Bridge"

2. Databases and search engines:

– electronic fund of legal and normative-technical documentation of the http://docs.cntd.ru/

– Yandex https://www.yandex.ru/ search engine

– Google search engine https://www.google.ru/

– abstract database SCOPUS http://www.elsevierscience.ru/products/scopus/

– http://quakes.globalincidentmap.com/,

– http://www. globalincidentmap. com/,

– ScienceDirect: http://www.sciencedirect.com

– EBSCO: http://search.ebscohost.com

–Sage Publications:http://online.sagepub.com

–Springer/Kluwer:http://www.springerlink.com

–University Information System RUSSIA:

http://www.cir.ru/index.jsp17.

http://plpnemweb.ucdavis.edu/nemaplex/Taxadata/G076S8.htm3. Specialized resources on nematodeology: http://www.inra.fr/hyppz/RAVAGEUR/3hetave.htm www.eppo.org/QUARANTINE/nematodes/Ditylenchus_dipsaci/DITYDI_imag http://www.booksite.ru/fulltext/1/001/010/001/253486564.jpg http://eppserver.ag.utk.edu/courses/EPP520/Radopholus%20similis%20misc_files/frame.htm http://ucdnema.ucdavis.edu/imagemap/nemmap/ent156html/slides/fromCD/0847/071B.GIF http://plpnemweb.ucdavis.edu/Nemaplex/Taxadata/G011S2.htm http://www.metla.fi/metinfo/metsienterveys/Lajit kansi/buxylo-n.htm http://plpnemweb.ucdavis.edu/nemaplex/Taxadata/G076S8.htm http://www.inra.fr/hyppz/IMAGES/7032246.jpg http://plpnemweb.ucdavis.edu/nemaplex/Taxadata/G076S3.htm#Contents http://www.invasive.org/browse/subimages.cfm?sub=4905 http://www.forestryimages.org/browse/detail.cfm?imgnum=1356130 http://www.rhs.org.uk/advice/profiles1001/leaf_bud_eelworm.asp

http://www.agrsci.dk/djfpublikation/djfpdf/gvm253.pdf

http://edis.ifas.ufl.edu/IN392

http://www.inra.fr/hyppz/IMAGES/7033332.jpg

http://www.plantdepommedeterre.org/eng/disease/nemal.htm

http://www.zin.ru/Animalia/Nematoda/rus/galnem/text5.htm

Educational and methodical materials for independent work of students in the development ofthe discipline / module:

1. *Romanenko N.D.* Phytohelminths – virus carriers of the family Longidoridae. – M.: Nauka,1993. – 284 p.
2. *Subbotin S.A., Osipova E.V.* Histological and cytological changes in the roots of a susceptible variety of barley in the defeat of an oat cyst-forming nematode // Bul. of the All-Union Institute of Helminthology named after Scriabin. – 1985. – T. 41. – P. 94.
3. *Subbotin S.A.* Changes in the ultrastructure of Citrus sinensis root cells under the influence of the citrus nematode Tylenchulus semipenetrans // Cytology and Genetics. – 1990. – Vol. 24. – No 1. –P. 3-8.
4. *Subbotin S.A.* Evolution of modified feeding cells induced by sedentary nematodes in plant roots // Ros. nematol. zhurn. – 1993. – Vol. 1. – No 1 – P. 17-26.
5. *Teplyakova T.V.* Bioecological aspects of the study and use of predatory fungi-hyphomycetes.

– Novosibirsk, 1999. – 252 p.

6. *Shesteperov A.A., Savotikov Yu.F.* Quarantine phytohelminthiases. – Kn. 1. – M.: Kolos, 1995.

– 463 p.

8. EVALUATION MATERIALS AND POINT-RATING SYSTEM FOR ASSESSING THE LEVEL OF FORMATION OF COMPETENCIES IN THE DISCIPLINE

Evaluation materials and a point-rating system for assessing the level of formation of competencies (part of competencies) based on the results of mastering the discipline "NON-MATODE DISEASES" are presented in the Appendix to this Work Program of the discipline.

DEVELOPERS:

Professor of Agrobiotechnology Department		Ignatov A.N.
(position, BCD)	(Signed)	(Surname: F.I.)

HEAD OF BCD:

Director of Agrobiotechnology Department		Pakina E. N.
(position, BCD)	(Signed)	(Surname: F.I.)

HEAD OF EP HE:

Director of Agrobiotechnology Department		Pakina E. N.
(position, BCD)	(Signed)	(Surname: F.I.)