NATIONAL UNIVERSITY OF LIFE AND ENVIRONMENTAL SCIENCES OF UKRAINE

Department of Genetics, Breeding and Biotechnology of Animals

«APPROVED»

Faculty of Veterinary Medicine «<u>19</u>» of June 2025

CURRICULUM WORK PROGRAM

FUNDAMENTALS OF ANIMAL BREEDING

Branch of knowledge Specialty:	H Agriculture, forestry, fishing, veterinary medicine H6 – «Veterinary medicine»									
Educational program:	«Veterinary medicine»									
Faculty:	Veterinary medicine									
Developer:	Candidate of Agricultural Sciences, Associate Professor of Genetics, Breeding and Biotechnology of Animals, Iryna SUPRUN									

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Field of knowledge, specialty, ed	lucational program ed	ucational level								
Educational level	M	laster								
Specialty	H6 «Veteri	nary medicine»								
Educational program	Veterinary medicine									
Characteristics of the discipline	I									
Kind	Re	quired								
Total hours		120								
Amounts of credits ECTS		4								
Amount of content modules		2								
Course project (work)	-									
Form of control	,	Test								
Indicators of academic disciplin	e for full term and red	uced period of studying								
	Full term of study	Reduced period of								
		studying								
Year of study (course)	2	2								
Semester	3	3								
Lectures	15	15								
Practical, seminar classes	-	-								
Laboratory classes	15	15								
Independent work	90	90								
Individual tasks	-									
Amount of weekly classroom	2 hours	2 hours								
hours										
for full-time education										

1. Purpose, competencies and program results of the discipline

The purpose is to acquaint future specialists with the objects of their professional work, namely: biological features of different types of agriculture. animals, their individual development, patterns of growth in different age periods, the nature and magnitude of productivity depending on physiological and technological factors, methods of breeding and selection, their impact on animal health and susceptibility to disease. The acquired knowledge will allow the veterinarian to take into account zootechnical factors in the treatment of various types of agriculture. animals.

As a result of studying the discipline the students have to

know: biological features of different types of agriculture animals, patterns of their growth and development at different ages, constitution and exterior, interior, breeding methods, selection, selection, as well as evaluation of breeders for the quality of offspring, the impact of selection on life and health, the consequences of inbreeding and heterosis.

be able: assess the constitution and body parts of the exterior, determine the direction of animal productivity, breed, type of constitution, condition,

susceptibility to disease, estimate productivity, determine the density of inbreeding, breeding value of animals.

Acquisition of competencies:

General Competences (GC). As part of the effects of final competence acquired in the learning process, graduates are able to:

GC10. communicate with representatives of other professional groups of different levels (with experts in other fields of knowledge / types of economic activity);

Professional (special competencies) (SC).

SC 2. The ability to use tools, special devices, laboratory equipment and other technical means to carry out the necessary manipulations during professional activity.

SC 10. Ability to develop strategies for safe, sanitary animal keeping. As part of the effects of final competence acquired in the learning process, graduates are able to be aware of the details of the decisions made, in particular regarding natural resources.

Program learning outcomes (PLO):

PLO 3. Determine the essence of physical and chemical, a biological processes that occur in the body of animals in normal and pathological conditions.

PLO 7. Formulate conclusions regarding the effectiveness of selected methods and means of keeping, feeding and treating animals, prevention of contagious and non-communicable diseases, as well as production and technological processes at enterprises for keeping, breeding or exploiting animals of various classes and species.

PLO 10. Propose and use expedient innovative methods and approaches to solving problematic situations of professional origin.

2. The program and structure of the discipline

	Amount of hours												
Names of content		Full-time							orres	pond	lence	for	n
modules and	we	tota		in	cludi	ng		weeks	including				
topics	ek	1	le	р	la	iv	i		lec	р	la	iv	ip
	S		c		b		p				b		
1	2	3	4	5	6	7	8	9	10	11	12	13	14
Content module № 1. Breed. Exterior. Interior. Constitution. Ontogenesis.													
Productivity													
Topic 1	1	9	2		1		6						
Introduction. The													
concept of the													
subject. The													
doctrine of breed.													
Identification													

- for full-time study

system in animal													
husbandry.													
Topic 2	2-	12	2		2		8						
Constitution,	3												
exterior, interior													
of agriculture													
annials.	2	15	2		1		10						
Topic 5 marviauar	3	15	2		1		12						
development of													
agricultural													
animals.		10			_								
Topic 4	4-	18	2		2		14						
Agricultural	5												
animals'													
productivity													
In total by the		51	8		6		40						
content module 1													
Content module 2. <i>Pedigrees. Tribal value. Selection and breeding methods.</i>													
Inbreeding. Heterosis. Features of selection and breeding of animals													
Topic 1. Methods	7-	18	2		2		12						
of agricultural	8												
animals' breeding.													
Breeding work in													
the herd.													
Topic 2. Breeding	9-	16			4		14						
value of animals.	1												
The technique of	0												
compiling													
individual and													
group nedigrees													
Tonic 3	1	20	2		Δ		10						
Theoretical and	1_	20					10						
nractical	1												
foundations of	$\frac{1}{2}$												
rojaction and													
selection.	1	0	2	<u> </u>			0						
1 opic 4. Biological		8	2				ð						
teatures and breeds	3-												
of cattle and	1												
horses.	4												
Topic 5. Biological	1	7	1				8						
features and breeds	5												

of poultry, pigs and										
sheep.										
In total by the		69	7		9	50				
content module 2										
Total hours	-	120	15		1	90				
					5					
Educational										
practice										
		30								
			25	-	-	5	-	-	-	-
(if available in the										
working										
curriculum)										
Total hours	-	150	40		1	 95				
					С					

3. Topics of lectures

N⁰	Name of topics	Amount
3/П		of hours
1.	Introduction. The study of breed	2
2.	Constitution, conformation, and interior of farm animals	2
3.	Individual development of farm animals	1
4.	Productivity of farm animals	2
5.	Breeding methods of farm animals	2
6.	Theoretical and practical foundations of selection, selection	2
	and mating. Genotypic parameters of selection	
7.	Biological characteristics and breeds of cattle and horses	2
8.	Biological characteristics and breeds of poultry, pigs, and	2
	sheep	
	In total	15

4. Topics of laboratory classes

N⁰	Name of topics	Amount
		of hours
1	Identification system in animal husbandry	1
2	Exterior of animals	1
3	Exterior assessment methods	1
4	Methods of accounting and estimation of animal growth	1

5	Accounting and evaluation of milk productivity	1
6	Accounting and evaluation meat productivity	1
7	Breeding methods. Crossing. Technique of drawing up	2
	crossing schemes	
8	Estimation of breeding value of animals by origin	4
9	Inbreeding. Technique of estimation of inbreeding coefficient	3
	In total	30

5. Independent work under the guidance of lecturer

N⁰	Name of topics	Amount of
		hours
1.	Study of the identification system in animal husbandry	9
2.	Estimation of exterior of animals	9
3.	Determination of absolute, average daily and relative grows	8
	gain	
4.	Milk productivity evaluation per lactation	2
5.	Meat productivity evaluation	2
6.	Evaluation of the productivity of various types of animals:	8
	pigs, sheep, poultry, horses	
7.	Drawing up crossing schemes	10
8.	Construction of different types of pedigrees	12
9.	Estimation of inbreeding coefficient	12
10	Preparation of abstracts or presentations about breeds of	16
	cattle, horses, sheep, pigs.	
	In total	90

- for reduced period of studying

	Amount of hours													
Names of content modules and topics			l-tin	ne		Correspondence form								
	we	tota		in	cludi	ng		weeks		ine	cludi	ng		
	ek	1	le	р	la	iv	i		lec	р	la	iv	ip	
	5		c		b		p				b			
1	2	3	4	5	6	7	8	9	10	11	12	13	14	
Content module.	Nº 1.	Exter	ior.	Inte	rior.	Con	stit	ution.	Bree	d. Or	ıtoge	nesis	5.	
	Productivity													
Topic 1	1	12	2		2		8							
Introduction. The														
concept of the														

subject. The doctrine of breed. Identification system in animal husbandry													
Topic 2 Constitution, exterior, interior of agriculture	2- 3	14	2		2		10						
animals Topic 3 Individual development of agricultural animals.	3	10	1		1		8						
Topic 5 Agricultural animals' productivity	4- 5	18	2		2		14						
In total by the content module 1		54	7		7		40						
Content module 2. <i>Pedigrees. Tribal value. Selection and breeding methods.</i> <i>Inbreeding. Heterosis. Features of selection and breeding of animals</i>													
Topic 1. Methods of agricultural animals' breeding. Breeding work in the herd.	6- 7	16	2		2		12						
Topic 2. Breeding value of animals. The technique of compiling individual and group pedigrees.	8- 9	20			4		16						
Topic 3. Theoretical and practical foundations of selection, rejection	1 0- 1 1	20	2		2		16						

and selection.										
Topic 4. Biological features and breeds of cattle and horses.	1 2- 1 3	10	2			8				
Topic 5. Biological features and breeds of poultry, pigs and sheep.	1 4- 1 5	10	2			8				
In total by the content module 2		66	8		8	50				
Total hours	-	120	15		1 5	90				
Educational practice 		30	25	_	_	-	-	-	-	-
Total hours	-	150	40			90				

3.1. Topics of lectures

N⁰	Name of topics	Amount
3/П		of hours
1.	Introduction. The study of breed	2
2.	Constitution, conformation, and interior of farm animals	2
3.	Individual development of farm animals	1
4.	Productivity of farm animals	2
5.	Breeding methods of farm animals	2
6.	Theoretical and practical foundations of selection, selection	2
	and mating. Genotypic parameters of selection	
7.	Biological characteristics and breeds of cattle and horses	2
8.	Biological characteristics and breeds of poultry, pigs, and	2
	sheep	
	In total	15

N⁰	Name of topics	Amount
3/П		of hours
1	Animal identification system	1
2	Exterior of animals. Exterior assessment methods	3
3	Methods of evaluating conformation and constitution. Major	2
	defects and faults in animal body structure.	
4	Methods of accounting and study of animal growth	1
5	Accounting and evaluation of dairy type of productivity	1
6	Accounting and evaluation of meat and other types of	1
	productivity	
7	Technique of drawing up crossing schemes	2
8	Techniques for compiling individual and group pedigrees	4
9	Inbreeding. Technique of estimation of inbreeding	2
	coefficient	
	In total	15

4.1. Topics of laboratory classes

5.1. Independent work under the guidance of lecturer

N⁰	Name of topics	Amount
3/П		of hours
1.	Study of the identification system in animal husbandry	9
2.	Estimation of exterior of animals	9
3.	Determination of absolute, average daily and relative grows	8
	gain	
4.	Accounting for milk productivity per lactation.	2
5.	Meat productivity accounting.	2
6.	Evaluation of the productivity of various types of animals:	10
	pigs, sheep, poultry, horses	
7.	Drawing up crossing schemes	10
8.	Construction of different types of pedigrees	12
9.	Estimation of inbreeding coefficient	12
10	Preparation of abstracts or presentations about breeds of	16
	cattle, horses, sheep, pigs.	
	In total	90

6. Methods and Tools for Diagnosing Learning Outcomes

• Oral or written questioning;

- Testing;
- Presentation (defense) of laboratory work

Questions for detailed answers and interviews at the exam:

1. The origin of different species of farm animals and poultry.

2. The concept about breed. The structure of the breed and methods of its maintenance.

- 3. Classification of breeds of animals.
- 4. Features of breeds and which factors determining their formation.
- 5. Tasks which should be solved by exterior estimation.
- 6. Estimation of the exterior of animals by measurements and indices.
- 7. Colorings, signs and marks of animals.
- 8. Methods of farm animal's exterior estimation.

9. Production and zootechnical accounting. Methods of identification in animal husbandry.

10. Domestication changes of farm animals.

11. Classification of types of constitution according to P.M. Kuleshov and MF Ivanov, their characteristics.

12. Sexual and economic maturity. Terms of sexual and economic maturity of farm animals.

13. Methods of studying the growth of farm animals. Absolute, average daily and relative gains using in animal husbandry. Calculation formulas.

- 14. Characteristics of the condition of farm animals.
- 15. Critical points of farm animals breeding. The main forms of underdevelopment of farm animals.

16. Characteristics of the period of embryonic development of farm animals, its duration in animals of different species.

- 17. Factors that determine the productivity of farm animals.
- 18. Estimation of sheep by wool productivity.
- 19. Estimation of agricultural birds productivity.

20. Methods of estimation of dairy productivity. Calculation of the average% of

fat (protein) in milk per lactation, the amount of milk fat (protein), kg.

- 21. Methods of estimation of meat productivity of animals.
- 22. Estimation of horses by working qualities.
- 23. Estimation of reproductive quality of sows.
- 24. Determining the density of inbreeding by Shaporuzh and Wright-Kislovsky.
- 25. Classification of inbreeding by degree of closeness.
- 26. Methods of breeding in animal husbandry.
- 27. Describe the main breeds of pigs. Hybridization in pig breeding.
- 28. Accounting and estimation of reproductive capacity of sows.

29. Hybridization in animal husbandry. Tasks, which could be solved by hybridization.

30. Pedigrees and their importance in animal breeding.

31. Rules and techniques for drawing individual pedigrees.

32. Classification of pedigrees.

33. Rules and techniques for drawing group pedigrees.

34. Genotypic selection parameters (selection effect, selection rate).

35. Define the concepts: selection, breeding.

36. The efficiency of selection in different environmental conditions. Features of selection of laboratory animals' selection.

37. Forms and methods of selection.

38. Stages of selection (sequence, direction).

39. Inbreeding depression and heterosis. Terms of inbreeding using.

40. Principles of selection. Classification of selection options. Forms of the heterosis effect expression.

41. Describe the main biological characteristics and features of breeding and selection of cattle.

42. Describe the main biological characteristics and features of breeding and selection of pigs.

43. Describe the main biological characteristics and features of breeding and selection of horses.

44. Describe the main biological characteristics and features of breeding and selection of sheep.

45. Describe the main biological characteristics and features of breeding and selection of poultry.

46. Describe the main breeds of meat productivity cattle.

47. Describe the main breeds of sheep. Production classification of sheep.

48. Describe the main breeds of dairy productivity cattle.

49. Describe the main breeds of horses.

7. Teaching Methods

- Practice-oriented learning;
- Flipped classroom;
- Inquiry-based learning;
- Teamwork.

8. Assessment of Learning Outcomes

The assessment of higher education students' knowledge is conducted on a 100point scale and converted into national grades according to Table 1 of the current "Regulations on Exams and Credits at NUBiP of Ukraine."

Type of Learning Activity	Learning Outcomes	Assessment
Module 1. Conformation. Interior. Constitution. Breed. Ontoge		
	Productivity	
Topic 1. Methods for Assessing Conformation and Constitution		
Laboratory work 1.	PLO 3, 7, 10.	5
Laboratory work 2.	Students should know:	5
Independent work	 Basic concepts of constitution, conformation, and interior of animals, including their species-specific characteristics. Methods for assessing conformation, constitution, and productivity of animals; criteria for selection, mating, and breeding. Students should be able to: Assess the constitution, sex type, and conformation of farm animals according to standards. Determine the production direction, breed, constitution type, and condition of animals based on their conformation. Identify animals' susceptibility to diseases based on the evaluation of conformation and constitution. 	5
Topic 2. Methods	for Recording and Studying the Grov	vth and
Laboratory work 3	After studying this tonic, the	5
	student should know:	
Independent work		5
	Biological patterns of growth and development of farm	

8.1. Distribution of Points by Types of Learning Activities

 animals at different age stages. Factors influencing growth, development, and productivity of animals. Basic methods for measuring, monitoring, and analyzing growth rates, live weight, morphological and physiological development indicators. Modern technologies for recording animal growth in various branches of animal husbandry and their importance for veterinary practice and breeding work. 	
Students should be able to:	
 Record and monitor growth and development indicators of animals at different age periods, considering species- specific characteristics. Analyze collected data to assess animal health, productivity, and conformity to age and breed standards. Identify deviations in growth rates and determine possible causes (pathological, genetic, technological). Use growth study results to predict productivity and develop recommendations for care, housing, and feeding of animals. Apply technical tools for collecting and analyzing information on animal growth and development. 	
PLO 3. Understand and explain	
biological processes regulating	
animal growth and development	

	under normal and pathological conditions. PLO 7. Formulate conclusions about the effectiveness of animal rearing methods, justifying the choice of housing, feeding conditions, and preventive measures.	
	PLO IU. Propose innovative	
	and making veterinary decisions	
	aimed at improving health and	
	productivity.	
Topic 3. Recording and	Evaluation of Milk and Meat Product	tivity of Farm
	Animals	
Laboratory work 4.	After studying this topic, the student should know:	5
Laboratory work 5.	Student Should Know:	5
Independent work	 Biological and physiological foundations of productivity formation in various species of farm animals. Indicators used to evaluate milk and meat productivity. Methods for recording productivity: milking trials, control milking, weighing, carcass measurements, etc. The impact of feeding, housing, care conditions, and technological stress on animal productivity. Breed characteristics and selection criteria related to milk and meat productivity. 	5
	 Record and comparatively evaluate animal productivity using quantitative and qualitative indicators (milk yield, fat and protein content; live weight gains, slaughter yield, etc.). Determine production direction, type, and condition 	

	 of animals based on evaluation results. Interpret productivity records to assess health status, and effectiveness of feeding, care, and housing. Formulate veterinary recommendations based on productivity analysis (identifying low-efficiency animals, selecting sires, etc.). Use specialized instruments, record-keeping documents, and software for productivity monitoring. PLO 3. Evaluate functional indicators of animals and physiological-biochemical processes underlying productivity, both under normal and pathological conditions. PLO 7. Draw conclusions about the effectiveness of feeding, housing, and organizational-technological measures based on productivity through veterinary support, adjustment of housing conditions, and preventive work 	
Modular Test 1		60
Total for Module 1		100
Module 2. Breeding Met Methods. Inbreeding. H	hods. Breeding Value. Selection and Ma leterosis. Features of Animal Selection a	ting. Breeding nd Breeding.
	Aften studying this teris the	
Laboratory work 1.	student should know:	5
Independent work	• Basic genetic concepts	15
	underlying neredity and variability in animals	
	 Patterns of trait inheritance 	

 from parents to offspring, including concepts of bloodline, inbreeding, and heterosis. Methods of pedigree analysis and principles of maintaining breeding documentation. Criteria and indicators for evaluating the breeding value of animals based on pedigree. The impact of selective breeding on maintaining health, productivity, and viability of the herd. 	
 Analyze pedigrees and determine the degree of relatedness and inbreeding coefficient. Assess the hereditary productivity and potential of animals based on pedigree results. Calculate breeding value indices and interpret them for further selection or culling. Identify valuable breeding animals based on genealogical data considering breeding goals. Formulate veterinary and breeding conclusions regarding the suitability of animals for reproduction. Use information systems for working with breeding databases 	
PLO 3. Understand the biological and genetic foundations of hereditary productivity, health, and disease resistance.PLO 7. Draw conclusions about the	

nd innovative breeding nships Among Animals and of Inbreeding	1 Determining
ing this topic, the	5
uld know:	10
asics of genealogical sis in animal husbandry eterinary science. epts of kinship, lineage, y, blood relationship, eding, and heterosis. ification of inbreeding ding to the degree of ness and its impact on al health and viability. equences of excessive eding: decreased ctivity, increased disease ence, and impaired ductive function. ods for calculating eding coefficients and sing genetic diversity in ations. nould be able to: ct, organize, and analyze on animal pedigrees. lish kinship relationships g animals using breeding nentation and electronic	
	nd innovative breeding nships Among Animals and of Inbreeding ing this topic, the uld know: asics of genealogical is in animal husbandry eterinary science. epts of kinship, lineage, 7, blood relationship, ding, and heterosis. fication of inbreeding ling to the degree of less and its impact on 1 health and viability. equences of excessive eding: decreased ctivity, increased disease nce, and impaired luctive function. ods for calculating eding coefficients and ing genetic diversity in ations. ould be able to: et, organize, and analyze n animal pedigrees. lish kinship relationships g animals using breeding mentation and electronic ases. late the degree of

	 inbreeding and analyze its potential consequences. Determine the genetic value of an animal considering its pedigree and risks associated with close breeding. Make selection and veterinary recommendations regarding the appropriateness of using animals in breeding programs. PLO 3: Assess biological and genetic processes affecting animal viability and reproductive capacity. PLO 7: Formulate conclusions about the breeding and veterinary feasibility of mating based on kinship degree and inbreeding closeness. PLO 10: Use modern methods to evaluate relatedness and make 	
	informed decisions about mate selection, aiming to minimize inbreeding load in the population.	
Modular Test 2		60
Total for Module 2		100
Coursework	(M1 + N	$M2)/2*0,7 \le 70$
Exam / credit		30
Total for the course	(Coursework	$+$ exam) ≤ 100

8.2. Correlation between higher education rating and national grades

Rating of higher education	National assessment
seekers,	for the results of compilation
points	exams
90 - 100	Perfectly
74 - 89	Fine
60 - 73	Satisfactorily
0-59	Not satisfactorily

8.3. Assessment policy

Policy on	Assignments	submitted	after	the	deadline	without	a	valid
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deadlines and retakes	reason will receive a lower grade. Retaking modules is allowed only with the lecturer's permission and upon presentation of a valid reason (e.g., a medical certificate).
Academic integrity policy	Cheating during tests and exams is strictly prohibited (including the use of mobile devices). Term papers and essays must include proper textual citations of the sources used.
Attendance policy	Class attendance is mandatory. In case of valid reasons (e.g., illness, international internship), individual online learning may be arranged with the approval of the faculty dean.

9. Methodical support

1. A working curriculum for the discipline "Fundamentals of Animal Breeding" has been developed

2. Electronic training course "Fundamentals of Animal

Breeding''<u>https://elearn.nubip.edu.ua/course/view.php?id=116</u> Автор курсу Супрун I.O.

Recommended literature 9.1.Basic literature

1. Мельник Ю.Ф. Практикум з розведення сільськогосподарських тварин / Ю.Ф. Мельник, К.А. Найденко, М.П. Журавель, А.В. Витриховська, М.М. Майборода, Т.В. Литвиненко. — К.: Видавничий Дім «Слово», 2007. — 240 с. 2. Розведення сільськогосподарських тварин / М.З. Басовський, В.П. Буркат, Д.Т. Вінничук та ін. — Біла Церква: БДАУ, 2001. — 400 с.

3. Супрун І.О. Основи розведення тварин: Робочий зошит. Методичні рекомендації для лабораторних і самостійних робіт студентів ОС «Магістр» за спеціальністю 211 «Ветеринарна медицина» / І.О. Супрун. — К.: НУБіП України, 2024. — 158 с.

4. Хмельничий Л.М., Супрун І.О. Основи розведення тварин / Л.М. Хмельничий, І.О. Супрун. — К.: НУБіП України, 2024. — 342 с.

9.2.Supporting literature

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2. Іовенко В.М. Вівчарство України. — К.: Аграрна наука, 2017.

3. Каталог жеребців-плідників, допущених до племінного використання / П.І. Вербицький, О.В. Білоус, О.О. Новіков, Д.А. Волков, І.В. Ткачова, О.М. Латка, О.В. Бондаренко, С.В. Лютих, О.О. Губін, Т.Є. Ільницька, Н.В. Зуєва,

Б.М. Гопка, Л.Ю. Безугла, В.Д. Марущак; за ред. І.В. Ткачової. — 2007. — 55 с.

- 4. Ладика В.І., Жукорський О.М., Грициняк І.І., Козир В.С., Катеринич О.О., Церенюк О.М., Хмельничий Л.М., Рєзникова Н.Л. Генетичні ресурси вітчизняних порід сільськогосподарських тварин: монографія. Одеса: Олді+, 2023. 336 с.
- 5. Найденко К.А., Журавель М.П., Витрихівська А.В., Тимченко О.Г. Родоводи с.-г. тварин. К.: НАУ, 1998.
- 6. Рибалко З.П., Буркат В.П., Березовський М.Д. Генофонд, оцінка та використання свиней. К.: Асоціація «Україна», 1994.
- 7. Рубан С.Ю., Даншин В.О., Мітіогло Л.В., Литвиненко Т.В., Сидоренко О.В., Свириденко Н.П. Генетичні ресурси тваринництва. К., 2022. 611 с.
- 8. Супрун І.О. Методичні рекомендації "Основи розведення сільськогосподарських тварин. Тестові завдання". К.: Компринт, 2014.
- 9. Супрун І.О. Методичні рекомендації з дисципліни "Розведення с.-г. тварин" "Poultry breeding": Методичні вказівки до виконання лабораторних та самостійних робіт студентами ОКР «Бакалавр» спеціальності 6.110100 «Ветеринарна медицина». К.: Компринт, 2015.
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9.3. Information sources

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