

MINISTRY OF EDUCATION AND SCIENCE OF UKRAINE
SUMY NATIONAL AGRARIAN UNIVERSITY
FACULTY OF AGROTECHNOLOGIES AND NATURAL RESOUSE
MENEAGMENT

«APPROVED»

Head of the admissions committee



[Signature]
V.I. Ladyka

2024

PROGRAM

Professional entrance exam in specialty 201 "AGRONOMY"
under the "AGRONOMY" educational program for foreign citizens entering the
MASTER'S DEGREE

Approved by the Methodological Council **Head of the professional attestation**
of the Faculty of Agrotechnology and **commission**
Environmental Management

(№ 10 of April 22, 2024)

Chairman of the Methodological Council
of the Faculty *[Signature]* Olha Bakumenko

[Signature] Olha BAKUMENKO

SUMY-2024

The program of the entrance examination for the specialty 201 "**Agronomy**" ("**Agronomy**") for the second (master's) level of higher education, – 2024. – 28 p.

The program was prepared by: Trotsenko V.I. – Doctor of Agricultural Sciences, Professor, Head of the Department of Agrotechnologies and Soil Science.

Mishchenko Yu.G. – Doctor of Agricultural Sciences, Professor, Head of the Department of Agrotechnologies and Soil Science.

Sergiyenko V.O. – responsible secretary of the SNAU admissions committee.

Reviewed and approved at the meeting of the department _____

Minutes No. _____ from " _____ " _____

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I. An explanatory note

Within this specialty, students receive theoretical and practical training to obtain scientifically based high yields of crops with the best possible minimum labor and material resources. They learn about the technological processes of producing environmentally friendly crop products. The training program provides for the study of the theoretical and practical foundations of highly efficient environmentally balanced landscape farming, methods of soil fertility restoration and protection from erosion.

Students receive additional in-depth training in both general ecology and its applied aspects, taking into account the world's experience in producing environmentally friendly agricultural products. The need for specialists in this specialization in Ukraine is increasing every year in connection with its accession to the World Trade Organization and its course towards European integration.

It involves training specialists in the most promising and new area of agricultural activity - the operation of modified plants, which allows them to acquire knowledge of obtaining genetically modified organisms, determining their advantages over conventional varieties and hybrids, the possibility of their practical use, and the specifics of growing and using the products obtained.

The main areas of training are breeding and seed production, technology of growing, storing and processing potatoes; seed production of cereal spiked crops, crop variety science, technology of growing vegetables, greenhouse farming.

Mastery of the theoretical foundations of agrochemical support and maintenance of agricultural enterprises, commodity producers, development of skills in the research and application of chemicals in the technological processes of growing agricultural products, preservation and improvement of soil fertility, taking into account natural conditions, production market, application of agrochemicals and services, mastering the latest technologies of using agrochemicals and growing crops, monitoring the state of the environment.

Students gain in-depth knowledge of commodity science of crop products with the basics of standardization, grain storage and processing technologies (baking, cereals and pasta production, processing of industrial crops, vegetables and fruits).

II. Program content

Discipline 1: Plant physiology

The purpose of discipline – formation of students of the necessary knowledge about the basic regularities of the plant's vital functions, the structural and functional organization of plants of various ecological groups, the formation of the ability to increase the quality of the production process of agricultural crops by influencing the main physiological processes of the plant organism.

The main tasks of the discipline – to study the main theoretical and practical provisions of the physiology of agricultural plants, the principles of managing the growth and development of cultivated plants, the factors of forming the optimal structure of sowing in order to obtain high yields.

The list of knowledge and practical skills upon completion of the study of the discipline:

Students should know: content and tasks of physiology as a fundamental biological science; features of morphology, physiology of the plant cell; types of transport of substances in the plant cell; general laws of plant metabolism; role and variety of enzymes; importance of protein substances for the full development of the plant organism; features of the chemical structure of enzymes, lipids, carbohydrates; patterns and features of carbohydrate metabolism; patterns and features of lipid metabolism; patterns and features of organic acid metabolism; patterns and features of respiratory tract of plants.

Students should be able to: to investigate the phenomenon of plasmolysis in an onion epidermal cell; to determine the osmotic potential of cell sap; to determine the suction power of potato cells; to determine the chemical composition of substances in plant tissues; to determine the activity of the catalase enzyme in plant objects; to conduct qualitative reactions to mono-, di-, and polysaccharides; to conduct qualitative reactions to proteins; to determine the intensity of plant respiration; to determine respiratory material; to calculate the respiration coefficient.

Literature

- 1.Zlobin Y.A.. A course in plant physiology and biochemistry. - Sumy: Univ. book, 2004. - 464 c.
- 2.Skliar V.G. Ecological physiology of plants / V.G. Skliar: University book, 2015. - 271 p.
- 3.Lukatkin AS. Selected chapters of ecological plant physiology / AS Lukatkin. - Saransk: Mordovian University Publishing House, 2005. - 86 p.
- 4.Makrushin M.M. Plant physiology / Makrushin M.M., Makrushina E.M., Peterson N.V., Melnikov M.M. - Vinnytsia: Nova Knyha, 2006. - 416 p.
- 5.Musienko M. M. Plant physiology / M. M. Musienko - K.: Phytosociocenter, 2001. - 392 p.
- 6.Salovarova VP Introduction to biochemical ecology: a textbook / Salovarova VP, Pristavka AA, Berseneva AA - Irkutsk: Irkutsk State University Publishing House, 2007. 159 p.
- 7.Chekalin S.V. Distribution and cold hardiness of woody plants of Eurasia: in 2 vols.

Discipline 2. Agropharmacology

The purpose of the discipline - to teach students how to use pesticides correctly, rationally and safely to minimize or eliminate negative impacts on humans, beneficial animals and the environment.

Objectives of the discipline - To study: the range of protective equipment, especially long-term registration, in the current list of pesticides and agrochemicals allowed for use in Ukraine; the mechanism of toxic effects of pesticides and agrochemicals; factors affecting pesticide toxicity and their mutual influence; the latest specialized machinery and technologies for the use of protective equipment, especially those that help to avoid risks to people and the environment in the event of pesticide use.

Students should know: basics of agronomic toxicology, properties of chemical plant protection products, their advantages and disadvantages, features and regulations of use, methods of quality control of pesticides and various methods of their application.

Students should be able to: select pesticides correctly, develop a system of their application on the farm, taking into account the technology of crop cultivation, determine the need for phytopharmaceuticals, personal protective equipment for workers, and machines for pesticide application, have the skills to analyze pesticides and provide first aid in case of poisoning.

Literature

1. Integrated plant protection systems. Methodical instructions for the implementation of course work for students in the specialty 8.130102 - "Agronomy" / Compiled by A.K. Mishnev, V.M. Demenko, O.V. Ilchenko - Sumy: SNAU, 2006. - 63 p.

2. Kosilovych G.O., Zaviriukha P.D., Golyachuk Y.S., Agropharmacology. Chemical protection of plants: a workshop.- Lviv: Kamula, 2014.-.160 p., ill.

3. H34 Workshop on phytopharmacology: Study guide. K.: Kondor-Vydavnytstvo, 2015. 314 p.

4. Phytopharmacology: Textbook / edited by Professors M.D. Yevtushenko, F.M. Maryutin. - K.: Higher Education, 2004. 432 p.

5. The list of pesticides and agrochemicals allowed for use in Ukraine. K.: Uninvest Marketing, 2003.

6. Science-based system of agriculture in Sumy region - Sumy: OJSC "SAD", publishing house "Kozatsky Val", 2004. - 662 p.

7. Agrotechnical method of plant protection: [Chulkin V.A., Toropova E.Yu: OOO "Izdatelstvo YKEA", 2000. - 336 p.

Discipline 3. Entomology

The purpose of the discipline – gaining theoretical and practical knowledge of the morphology, biology, ecology of insects, their harmfulness and methods of crop protection.

The main tasks of the discipline – to study the theoretical foundations of the discipline, species composition of pests, methods of plant protection to regulate insect phytophages in crops and plantations of agricultural crops to an imperceptible economic level.

Students should know: the role of the subject "Entomology" in the formation of an agronomist, tasks and connection with other disciplines; losses from crop pests in Ukraine and abroad; the current structure of the plant protection service in Ukraine; general characteristics of animal groups that harm agricultural plants; measures to protect the most

damaged crops and the specifics of their application; the main polyphagous and specialized pests of cereals by zone, growth period and development of crops, integrated protection of cereals from pests.

Students should be able to: select and apply insecticides to protect crops of legumes and forage legumes, sugar beet, industrial, vegetable, fruit and berry crops; determine the species composition of omnivorous and specialized pests of annual and perennial legumes, sugar beets, potatoes, sunflower, flax, vegetables, fruits and berries using the determining tables, pest collections and herbarium of damaged plants; determine the species composition of pests of grain and its products from the collection of pests.

Literature

1. Demenko VM Entomology: a textbook / VM Demenko, OM Yemets - Sumy: SNAU, 2019. 440 p.
2. List of pesticides and agrochemicals approved for use in Ukraine. - 1040 p. □K.: UNIVEST MEDIA, 2018.
3. Quarantine pests and plant diseases /B. M. Supikhanov, V. I. Levchenko, V. M. Ivchenko and others - OJSC "SOD", Kozatsky Val, 2004. 184 p.
4. Movchan O. M. Quarantine pests. Part 1: Quarantine pests - K.: Svit, 2002. - 288 p.
5. Science-based system of agriculture in Sumy region. - Sumy: OJSC "SAD", publishing house "Kozatsky Val", 2004. - 662 p.
6. Optimization of integrated protection of field crops: Handbook / [Y. H. Krasylivets, V. S. Zuza, V. P. Petrenkova, V. V. Kirichenko and others]; edited by V. V. Kirichenko, Y. H. Krasylivets - Kharkiv: Magda LTD, 2006. 252 p.
7. List of pesticides and agrochemicals authorized for use in Ukraine - K.: UNIVEST MEDIA, 2010. □ 543 c.
8. Ruban M.B. Workshop on agricultural entomology: a textbook / M.B. Ruban, Y.M. Hadzalo; edited by M.B. Ruban. - K. - Aristey, 2009. - 472 p.
9. Ruban M. B. Pests of vegetable and fruit and berry crops and measures of protection against them: a textbook for agrarian higher education institutions of I-IV accreditation levels in the field of "Agronomy" / Ruban M. B., Gadzalo Y. M., Bobos I. M. - K.: Urozhay, 2004. 264 p.
10. Agricultural Entomology / [Baidyk G.V., Biletskyi E.M., Bilyk M.O. et al. eds.

Discipline 4. Phytopathology

The purpose of the discipline – The purpose of the discipline is to develop students' professional knowledge and skills in identifying crop diseases, species composition of pathogens and areas of distribution, diagnostic signs of disease manifestation on various plant organs, the influence of biotic and abiotic environmental factors on disease development, sources and places of infection reserves, protection measures against individual diseases and diseases of a particular crop.

The main tasks of the discipline – The main objectives of the discipline "Phytopathology" are to study the main symptoms of agricultural plant diseases and to develop a system of protection against them.

Students should know: Subject and objectives of phytopathology. Features of pathogenesis in the affected plant. Diseases of non-infectious and parasitic origin. Pathogens

of plant diseases. Ecology and dynamics of infectious plant diseases. Methods of phytopathology, diagnosis and accounting of diseases. Diseases of cereals. Diseases of legumes and perennial legumes. System for limiting the development and spread of diseases of various crops. Diseases of industrial crops and potatoes, vegetables, fruit and berry crops. A system for limiting the development and spread of diseases of various crops.

Students should be able to: Diagnose diseases by symptoms. Identify viruses, mycoses, bacterioses and flower parasites. Identify pathogens of cereals, legumes and perennial legumes. Develop modern systems to limit the development of diseases of various crops. Identify pathogens of industrial crops and potatoes, vegetables, fruit and berry crops. Develop modern systems to limit the development of diseases of various crops.

Literature

1.Kolodiychuk V.D. Workshop on agricultural phytopathology []: a textbook / V.D. Kolodiychuk, A.I. Kryvenko, N.I. Shushkivska. – K. : Center for Educational Literature, 2013. – 230 c.

2.Markov I.L. Workshop on agricultural phytopathology [Text]: for students of agronomy specialties of higher agricultural educational institutions of III-IV levels of accreditation / I.L. Markov. - K. : NSC "Institute of Agrarian Economics", 2011. - 527 p.

3.Markov IL Handbook on the protection of field crops from diseases and pests / IL Markov, MB Ruban. – K.: Uninvest Media Company LLC, 2014. 384 c.

4.Markov I.L. Workshop on the basics of scientific research in plant protection / I.L. Markov, L.P. Pasichnyk, D.T. Gentosh ; edited by I.L. Markov. - K. : Agrarian Media Group, 2012. – 264 c.

5.Markov I.L. Phytopathology: Textbook / I.L. Markov, O.V. Bashta, D.T. Hentosh, V.A. Hlymyaznyi, O.P. Dermenko, E.P. Chernenko; edited by I.L. Markov - K.: Phoenix, 2016. 490 p;

6.Maryutin F.M. Phytopathology: a textbook / Maryutin F.M., Panteleev V.K., Bilyk M.O. - Kharkiv: Espada, 2008 - 552 p.

7.Minkevich I.I.. Phytopathology. Diseases of tree and shrub species: / I.I. Minkevich, T.B. Dorofeeva, V.F. Kovyazin. – St. Petersburg; Moscow; Krasnodar: Lan, 2011. – 160 c.

8.Peresyphkin V.F. Agricultural phytopathology / V.F. Peresyphkin - Kyiv: Agrarian Education, 2000. 415 p.

9.Strategy and tactics of plant protection: [monograph]. - (Series "Intensive farming"). Vol. 1: Tactics / [V.P. Fedorenko, I.L. Markov, E.Y. Morderer]; edited by Academician of the National Academy of Agrarian Sciences of Ukraine V.P. Fedorenko. - Kyiv : Alfa-Stevia, - 2015. - 500 p.

10.Strategy and tactics of plant protection: [monograph. - (Series "Intensive farming"). 2: Tactics / [V. P. Fedorenko, I. L. Markov, E. Y. Morderer] ; edited by V. P. Fedorenko, Academician of the National Academy of Sciences of Ukraine.]. - Kyiv : Alfa-Stevia, - 2015. - 784 p.

11.Yanovskyi Y.P. Integrated protection of fruit crops: a textbook / Y.P. Yanovskyi, I.S. Kravets, I.V. Krikunov, I.I. Mostoviak, S.M. Mostoviak; ed. - Kyiv: Phoenix, 2015. 646 p.

Discipline 5. Agriculture

The purpose of the discipline – formation of students' knowledge and skills in the scientific foundations of agriculture, modern environmentally friendly and economically feasible measures to protect crops from weeds, design of rational crop rotations, systems of resource-saving tillage and erosion control measures, features of industrial, soil protection, environmental, biological (organic) farming systems.

The main tasks of the discipline – studying plant life factors, basic laws of agriculture, agrobiological characteristics of weeds, crop requirements for predecessors, and soil cultivation.

Students should know: scientific bases and laws of agriculture; factors of plant life and methods of their regulation in agriculture; indicators of soil fertility, their regulation and ways to reproduce soil fertility; scientific bases of crop rotations, principles of their design and development; scientific bases, measures, methods and systems of soil cultivation; agrotechnical requirements for sowing crops and measures for crop care; types of soil erosion and deflation and measures to prevent them.

Students should be able to: apply the laws of agriculture in production; determine and regulate the main agrophysical indicators of soil fertility; determine the species composition of weeds, plan and implement a system of measures to protect crops from them; develop the structure of sown areas, draw up crop rotation schemes and implement them in production; develop information and logical models of field weediness and soil cultivation for individual crops in different soil and climatic conditions; plan and implement measures and systems of resource conservation

Literature

1. Boyko P.I., Sayko V.F. Crop rotation in agriculture of Ukraine - K.: Agrarian Science, 2002. 145 c.
2. Vorobiev S.A. Crop rotations of intensive agriculture. - M.: Kolos, 1979. - 368 p.
3. Vereshchagin L. N. Atlas of weed, medicinal and honey plants. Marketing, 2002. - 380 p.
4. Gordienko V. P., Herkyial O. M., Opryshko V. P. Agriculture. - K.: Vyshytsia Shk. 1991. - 267 p.
5. Gudz VP, Primak ID, Budyonnyi YV Agriculture: Textbook - K.: Urozhay, 1996. - 384 c.
6. Gudz V.P., Explanatory Dictionary of General Agriculture - K.: Agrarian Science, 2004. 220 c.
7. Gudz V.P., Primak I.D. et al. Adaptive farming systems: Textbook - K.: Center for Center for Educational Literature, 2007. 334 p.
8. Land resources of Ukraine / Edited by Academician V. V. Medvedev - K.: Agrarian Science, 1998.150 c.
9. Krikunov V.G. Soils and their fertility: Textbook. - K.: Vysha Shkola, 1993. – 287 p.
10. Lisoval AP, Makarenko VM, Kravcheko SM The system of fertilizer application: Higher School, 2002. 317 p.
11. Maltsev T.S. Issues of Agriculture. - Moscow: Selkhozgiz, 1955. - 430 p.
12. Nazarenko I.I., Polchyna S.M., Nikorych V.A. Soil Science: Textbook - Chernivtsi, 2003. - 400 c.

13. Nazarenko I.I. Agriculture and land reclamation: Textbook. - Chernivtsi, 2006. - 375 p.
14. Ovsinsky IE New system of agriculture. - Moscow, 1999. - 105 p.
15. Primak I.D., Gudz V.P., Roshko V.G. et al. Mechanical tillage in agriculture. Bila Tserkva, 2002. 320 p.
16. Primak I.D., Gudz V.P., Vakhniy S.P. et al. Erosion and deflation of soils and measures to combat them. - Bila Tserkva, 2001. - 392 p.
17. Primak I.D., Gudz V.P., Roshko V.G. et al. Rational crop rotations in modern agriculture. - Bila Tserkva, 2003. - 384 p.
18. Reut I. B. Physics of soils: Kolos, 1972. - 356 p.
19. Shykula M.K. Reproduction of soil fertility in soil protection agriculture: Oranta, 1998. 662 p.

Discipline 6. Soil science with the basics of geology

The purpose of the discipline – developing students' basic knowledge of soil (its composition, properties, soil regimes, processes, genesis), soil classification, soil diversity, and use.

The main tasks of the discipline – gained knowledge about: - geological processes that form the relief of the Earth's crust; soil science as a fundamental natural science discipline, about soil as a special natural body and the laws of its development; morphological features of the soil profile; diversity and geographical distribution of soils; the role of soil in the functioning of biogeocenoses and the biosphere as a whole.

Students should know: geological structure of the Earth, the concept of primary and secondary minerals, methods of their formation, the main representatives of mineral classes; igneous, metamorphic and sedimentary rocks, their structure, texture, conditions of occurrence, use in the national economy; hypergenesis, endogenous processes; tasks and methods of soil science; Principles and factors of soil formation in different geographical areas; classification of mechanical composition and importance of each fraction (mineralogical composition); four components of the organic part of the soil, their chemical composition and importance; composition and importance of humus; principles of soil absorption capacity; determination of soil acidity, alkalinity and buffering capacity, soil water regime, characterize it using the Vysotsky coefficient; physical and physical-mechanical properties of soil; value and composition of soil solution; determination of types of soil fertility, causes of soil radioactivity; classification of soils, podzolic and boggy processes of soil formation; features of soil formation in the Polissya zone; know the sod and salt processes, features of soils of the Forest-Steppe, Steppe and mountainous regions of the Crimea and the Carpathians, measures to increase their fertility; types of fertility.

Students should be able to: identify the main representatives of mineral classes, metamorphic, igneous and sedimentary rocks, use knowledge of their diagnostic features; take soil samples in the field, prepare them for analysis, determine the mechanical composition of the soil sample, humus content, coagulation threshold of colloids; determine soil density, field moisture, hygroscopic moisture content, pH and hydrolytic acidity; describe the profiles of sod-podzolic, sod-carbonate, glazed, marsh and gray forest soils, recommend measures to increase fertility; identify typical chernozems, podzolic, regraded, ordinary,

southern, chestnut soils, salt marshes, malt and salt marshes, and recommend measures to increase their fertility.

Literature

1. Soil Science // Edited by D. G. Tikhonenko - K. : Vyshytsia Osvita - 2005. - 703 p.
2. Soil science with the basics of geology / M. V. Kapshtyk, N. R. Petrenko [et al.
3. Soils of Ukraine: properties, genesis, fertility management: a textbook / [V. I. Kupchyk, V. V. Ivanina, G. I. Nesterov, et al.
4. Zaritskyi P. V. Geology with the basics of mineralogy: textbook - third, significantly supplemented and revised edition / P. V. Zaritskyi, D. H. Tikhonenko, M. O. Gorin, V. V. Andriev, V. V. Degtyarev (for students of agronomic, environmental, engineering specialties of educational institutions of the III-IV level of accreditation) - Kh.
5. Nazarenko I.I. Soil science: a textbook / I.I. Nazarenko, S.M. Polchyna, V.A. Nikorych. - Chernivtsi, Books - XXI, 2003. 400 p.
6. Workshop on soil science: a textbook / edited by D. G. Tikhonenko. 6th ed: Maidan, 2009. 447 p.
- 7.

Discipline 7. Agrochemistry

The aim of the discipline is to develop students' solid knowledge and skills in the rational use of organic fertilizers and chemical ameliorants to ensure high crop yields, restore soil fertility, preserve the environment, and master modern methods of analysis in the soil-plant-climate-fertilizer system.

The main tasks of the discipline – studying the cycle of substances in agriculture, developing measures to influence the biological and chemical processes occurring in soil and plants, studying the methods of fertilizer application in order to use them most effectively to improve soil fertility.

Students should know: a modern understanding of the mechanism of nutrient supply and their assimilation by plants, the physiological role of each element for plants, as well as an understanding of the types of soil absorption capacity, absorption capacity and buffering capacity of soil in the processes of interaction with fertilizers, and the determination of the need for soil chemical reclamation, the role of organic fertilizers in preserving and maintaining a deficit-free balance of humus in the soil, as well as having an understanding of the technology of manure storage and application and the value of straw and green fertilizers in preserving and improving soil fertility, and how to apply them. classification of fertilizers, their interaction with the soil-absorbing complex, features of the use of mineral fertilizers, name ways to increase the efficiency of mineral fertilizers, their impact on the size and quality of the crop, scientific and theoretical foundations of the fertilizer system, classification of methods for determining fertilizer rates for agricultural crops. crops and the peculiarities of using fertilizers for individual crops, as well as have an understanding of the impact of fertilizers on the environment.

Students should be able to: to select plant and soil samples for agrochemical analysis, determine the content of available forms of nutrients in the soil, calculate the reserves of nutrients in the soil, determine the need of the farm for organic fertilizers and suggest ways to saturate crop rotation fields with them, recognize mineral fertilizers by organoleptic characteristics, recognize fertilizers by qualitative reactions, make calculations to determine

the rates of fertilizers in active substance and physical weight; develop a system of fertilizer application for a particular farm, determine the need for agricultural coolants.

Literature

1. Gospodarenko G.M. Agrochemistry: Textbook / G. M. Gospodarenko - K. : LLC "SIC GROUP Ukraine", 2015. 406 p.
2. Shevchuk M.Y. Agrochemistry: Textbook / M.Y. Shevchuk, S.I. Veremeenko, V.I. Lopushnyak - Lutsk: Nadstyrya, 2012. 468 p.
3. System of fertilizer application: Study guide / G. M. Gospodarenko - K. : LLC "CIC GROUP Ukraine", 2015. 332 p.; ill.
4. Herkyial O. M. / Agrochemistry: Textbook / O.M. Herkyial, G.M. Gospodarenko, Y.V. Kolarkov. - Uman, 2008. - 300 p.
5. Karasiuk I.M. Agrochemistry: Textbook / I. M. Karasiuk and others - K.: 2008. - 471 p.
6. Gorodnyi M.M. Agrochemistry: Textbook / M.M. Gorodiy - K. : Aristey, 2008. - 936 c.
7. Likhochvor V. Mineral fertilizers and their application / V. Likhochvor - Lviv: SPF "Ukrainian Technologies", 2008. 312 p.
8. Lysoval AP Fertilizer application system / AP Lysoval, VM Makarenko, SN Kravchenko - K. : Vysha Shkola, 2002. - 317 p.
9. Marchuk I. Fertilizers and their use: Study guide / I.U. Marchuk, V.M. Makarenko, V.E. Rastalnyi and others - K. : Aristey, 2013.
10. Gospodarenko H.M. Agrochemistry: Textbook / H.M. Gospodarenko - K.: SIC GROUP Ukraine LLC, 2018. 556 p.
11. Gospodarenko G.M. Fertilization of horticultural crops: Study guide / - K.: LLC "CIC GROUP Ukraine", 2017. - 334 p.

Discipline 8: Vegetable growing

The purpose of the discipline – to provide students with theoretical knowledge and mastery of technological methods of growing vegetable crops to ensure maximum realization of the biological potential of yields.

The main tasks of the discipline – study of the state and prospects of vegetable growing in Ukraine and abroad, current trends and directions of vegetable growing; study of biological characteristics of vegetable crops and methods of their reproduction; study of technologies for growing high marketable yield of vegetable crops in order to obtain environmentally friendly products with minimal labor costs in the zonal context; ensuring the organization of conveyor production of fresh marketable high-vitamin vegetable products throughout the year for human consumption; ensuring plant protection against weeds.

Students should know: biology of vegetable crops. Classification and origin. Requirements for environmental conditions and their optimization in open and closed ground. Botanical classification and grouping of vegetable plants. Requirements of vegetable crops to growing conditions and methods of their regulation. General issues of vegetable production technology. Crop rotation. Soil cultivation system. Methods of reproduction and sowing of vegetable plants. Seedling method. Methods of growing vegetable crops. Technologies for growing high-quality marketable crops of vegetable crops, its acceptably environmentally friendly products in state, leased, farms, peasant farms. Management of the plant protection

system against weeds, pests and diseases in order to introduce the latest technologies for obtaining high-quality marketable, environmentally acceptable vegetable products.

Students should be able to: Determine the environmental requirements of crops, recognize vegetable seed. Create vegetable crop rotations. Calculate the seeding rate of vegetable plants. Develop an agrotechnical plan for growing vegetables in the open field, make up the need for seeds, fertilizers, pesticides, fuel, containers and other material and technical means for growing vegetable crops.

Literature

1. Likhatskyi V.I. et al. Vegetable Growing: Workshop / Edited by V. Likhatskyi - Vinnytsia, 2012. 461 p.

2. Andriushko A.Y. Modern technologies of production and marketing of agricultural crops / A.Y. Andriushko, S.V. Bocharov, O.I. Varovi, Y.I. Sologub. - K., 2002. - 301 p.

3. Gil L.S. Modern industrial production of vegetables and potatoes using drip irrigation and fertigation systems / L.S. Gil, V.I. Dyachenko, A.I. Pashkovsky, L.T. Sulima - K.: Ruta, 2007. - 315 p.

4. Gil L.S. Fertigation - irrigation with the use of soluble fertilizers in drip irrigation systems / L.S. Gil - K.: Ethnos, 2005. - 234 p.

5. Gil L.S. Modern technologies of vegetable growing in closed and open ground: a textbook / L.S. Gil, A.I. Pashkovsky, L.T. Sulima - Vinnytsia: New Book, 2008. 364 p.

6. Modern technologies of growing and protection of vegetable crops / Lapa O.M., Drozd V.F., Gogolev A.I. - K.: Higher School, 2004. 265 p.

7. Open field vegetable growing: a textbook / N.V. Grekova [et al. - Lviv: "Magnolia 2006, 2013. - 470 c.

Discipline 9: Breeding and seed production

The purpose of the discipline – to provide students with knowledge about modern achievements in breeding research, the main tasks and directions of plant breeding, to develop students' knowledge and skills in the scientific basis of breeding and seed production of genotypes (varieties, hybrids, lines) of field crops, as well as in conducting varietal control to obtain high yields in farms with intensive crop cultivation.

The main tasks of the discipline - theoretical and practical training of students in the history of development and modern achievements of breeding and seed research, the main tasks and directions of breeding and seed production, genetic basis of plant breeding, the use of polyploidy, aneuploidy, haploidy, mutagenesis, heterosis and biotechnology in plant breeding, methods of selection, mastering the theoretical foundations of seed production: varietal qualities and yield properties of seeds, dependence of the level of yield on seed quality, seed quality and its importance, causes of deterioration of varieties, principles and features of zonal organization of seed production, organization of industrial seed production, features of seed production of individual crops and storage of seed funds.

Students should know: Classification of varieties by origin and methods of creation. Production requirements for the variety. The role of source material in plant breeding. Scheme of breeding work with cross-pollinated crops. Theoretical foundations of seed production: varietal qualities and yield properties of seeds. Dependence of yield level on seed quality. Types of seed quality and its importance. Causes of deterioration of varieties.

Variety replacement and variety renewal. Principles and features of zonal organization of seed production. Organization of industrial seed production. Distinctive principles of industrial seed production. The concept of insurance and transitional seed funds. Ecological bases of seed production. Features of seed production of individual crops. Production of hybrid seeds of different types of hybrids. Organization of storage of seed funds

Students should be able to: Analyze the natural, climatic and environmental factors of the growing area. Identify factors for increasing productivity and ensuring sustainable agriculture. Be able to create models of the future variety. Know the peculiarities of calculating the potential yield in terms of moisture availability, bioclimatic potential, soil fertility. Analyze the breeding and valuable traits of varieties for the future. Identify the main genetic characteristics of the plant that affect the productivity of the variety. Know the basic production requirements for future varieties that are as close to ideal as possible. To develop parameters of breeding-value traits of the variety model. Conduct high-level individual, mass and clonal selection. Have a methodology for evaluating breeding material in various areas of selection. Determine the sowing, varietal and yield properties of seeds. Identify the main categories of seed quality. Identify the main causes of deterioration of varieties in the process of their production use. Determine the effectiveness of using a new more productive variety. Calculate the need for seeds and seed areas of field crops for farm conditions.

Literature

1. Gavryliuk M.M. Fundamentals of modern seed production / M.M. Gavryliuk; UAAS. - K. : NSC IAE, 2004. - 256 c.
2. Makrushyn M.M. Seed production (methodology, theory, practice): textbook / M.M. Makrushyn, E.M. Makrushyna; ed. by M.M. Makrushyn. - 2nd ed. supplemented and revised - Simferopol: Publishing house "Arial", 2012. - 536 c.
3. Molotskyi M.Y. Breeding and seed production of field crops: a workshop / M.Y. Molotskyi, S.P. Vasylykivskyi, V.I. Kniaziuk. - 2nd edition, revised and supplemented - Bila Tserkva: Bila Tserkva National Agrarian University, 2008. - 192 c.
4. Selection and seed production of agricultural plants: textbook / M. Molotskyi, S. Vasylykivskyi, V. Knyaziuk, V. Vlasenko - K.: Vysha Osvita, 2006. 463 p.
5. Selection of fruit and vegetable crops: a textbook. Part 1: General principles of selection of garden plants / A.I. Opalko, O.A. Opalko. - Uman: Research and Development Enterprise "Sofiyivka" of the National Academy of Sciences of Ukraine, 2012. - 338 c.
6. Chekalin M.M. Selection and genetics of individual crops: a textbook: FOP Govorov S.V., 2008.- 368p.
7. Methods of inspection of seed crops of grain crops / [V. Sokolov, V. V. Vyshnevsky, M. O. Kindruk and others] - Odesa-Kyiv, 2010. 35 p.
8. Special selection of field crops: a textbook / V.D. Bugayov, S.P. Vasylykivsky, V.A. Vlasenko and others; edited by M.Y. Molotsky - Bila Tserkva, 2010.
9. Special selection and seed production of field crops: a textbook; prepared by: N.I. Ryabchun, M.I. Yelnikov, A.F. Zvyagin and others; edited by. V.V. Kirichenko - Kh.

Discipline 10. Forage and grassland production

The purpose of the discipline – Formation of specialists with knowledge of fodder crops cultivation technology, methods of harvesting and storing high-quality fodder.

The main tasks of the discipline – theoretical justification of the basics of creating a fodder area, biology and technology of growing fodder and fodder crops, harvesting and storing fodder.

Students should know: types of perennial and annual fodder crops of hayfields and pastures and their fodder value, main types of fodder, know the biological and ecological characteristics of fodder crops, poisonous and harmful plants, methods of inventory and certification of fodder lands, systems of improvement of fodder lands, creation and use of pastures.

Types of fodder, their fodder value and technologies for growing fodder crops in field crop rotations, methods for determining the need for fodder and ways to obtain it; modern technologies for harvesting and preserving fodder; technologies for harvesting hay, grass harrow and chaff; technologies for harvesting silage, haylage; technologies for harvesting artificially dried fodder. Non-traditional and rarely used methods of forage harvesting. Scientific achievements in improving feed preparation technologies. Requirements for raw materials, time of the main events, tools and facilities. New fodder crops;

Students should be able to: To be able to identify fodder, poisonous and harmful plants from the herbarium, to establish measures for the rational use and improvement of natural fodder lands. To calculate the need for feed, seeds, area of sowing fodder crops, to develop a green conveyor. Analyze modern technologies for harvesting and preserving fodder and identify ways to reduce nutrient losses, assess the quality and record of fodder.

Literature

1. Zinchenko O.I. Fodder production. - K.: Vysha Shkola, 1999. - P. 121.
2. Makarenko P.S. Handbook on fodder production. - K.: Urozhay, 1984. - P. 206.
3. Bilonozhko M.A. Plant growing: Laboratory workshop. - P. 205.
4. Motruk B.I. Plant growing. - K.: Urozhay, 1999.
5. Crop production with the basics of crop programming / O.G. Zhatov, L.T. Glushchenko, G.O. Zhatova and others. - K.: Urozhay, 1995.
6. Zinchenko O.I. Field fodder production. - K.: Higher school, 1987. -P. 137.
7. Likhochvor V.V., Prots R.R. Potatoes, Jerusalem artichoke, sweet potato, etc. - 2nd ed.
8. Likhochvor V.V. Winter and spring rape - Lviv: SPF "Ukrainian Technologies", 2002.-48 p.
9. Likhochvor V.V. Winter and spring rape - Lviv: Ukrainian Research and Production Association "Ukrainian Technologies", 2002.-48 p.
10. Crop production with the basics of fodder production / O.G. Zhatov, V.I. Trotsenko, L.T. Glushchenko, G.O. Zhatova and others. - K.: Urozhay, 1995.

Discipline 11. Crop production

The purpose of the discipline – formation of theoretical and practical level of training in the field of "Agronomy"

The main tasks of the discipline – mastering theoretical knowledge of species biology and practical skills in growing field crops, maximizing their use and biological potential.

Students should know: Passage of ontogenesis phases in cereals, legumes and melons. Normal reaction of these groups of crops to the main environmental factors. Anatomical

structure and main morphological features of the main types and varieties of crops. Passage of phases of ontogeny in potatoes, beets, turnips, Jerusalem artichoke, carrots. Normal reaction of these crops to the main environmental factors. Anatomical structure and main morphological features of the main types and varieties of crops.

Students should be able to: Calculation of yield indicators. Calculation of sowing rates and fertilizer doses for the planned crop. Calculation of sowing rates. Estimated parameters of planting density formation. Preparation, drawing up and calculation of the agrotechnical part of technological maps for the specified crops. Calculation of yield indicators. Calculation of sowing rates and fertilizer doses for the planned harvest. Calculation of sowing rates. Calculation of the parameters of planting density formation. Preparation, drawing up and calculation of the agrotechnical part of technological maps for the specified crops.

Literature

1.Plant growing: Textbook / O.I. Zinchenko, V.N. Salatenko, M.A. Bilonozhko and others; Edited by O.I. Zinchenko - K.: Agrarian Education, 2001. - 591 p.

2.Crop production with the basics of fodder production: Textbook / O.M. Tsarenko, V.I. Trotsenko, O.G. Zhatov, G.O. Zhatova; Edited by O.G. Zhatov - Sumy: University book, 2003. -385 p.

3.Likhochvor V.V. Plant growing. Technologies of growing crops. - Lviv: SPF "Ukrainian Technologies", 2002. - 797 p.

4.Plant growing with the basics of processing technology. Workshop / A.V. Melnyk, V.I. Trotsenko, O.G. Zhatov and others; Edited by. A.V. Melnyk, V.I. Trotsenko - Sumy: University book, 2008. -384 c.

5.Likhochvor V.V., Prats R.R. Winter wheat: SPF "Ukrainian Technologies", 2006. 216 p.

6.Trotsenko V.I., Zhatov O.G., Glupak Z.I., Danilchenko O.M. Plant growing. Workbook for laboratory and practical work: For students majoring in 201 "Agronomy" and 202 "Plant Protection" of full-time and part-time study // Sumy: SNAU, 2020, 70 p.

7. Zhatov O.G., Glushchenko L.T. Crop production. Methodical instructions for determining the sowing qualities and physical and chemical properties of seed material // Sumy 2019, 43 p.

III. Questions for the professional entrance examination for applicants to the specialty 201 "Agronomy" under the educational program "Agronomy" at the second (master's) level of higher education

Plant physiology

1. Among the organs of the same plant, the largest value of the suction force is in
2. The share of stomatal transpiration from the surface of adult leaves of the total amount of water lost is (in %)
3. The reason for the decrease in water absorption by the root system on compacted soils
4. Active transport of mineral nutrients occurs by
5. Passive supply of nutrients through the membrane is provided by
6. In what phase of photosynthesis is formed phosphoglycerol aldehyde?
7. Photosynthetic potential of crops is determined by
8. The main respiration is called such breathing, in which the respiratory material is used
9. The greatest amount of energy is released during the transformation of organic matter at the stage of
10. The primary mechanisms of growth processes include
11. The phenomenon of adhesion of daughter cells to each other to form a homogeneous tissue is called
12. Induction of flowering on a short day is characteristic of plants
13. In a cell, oxidoreductase enzymes are localized in
14. The enzyme catalase belongs to the class
15. The common name of the pigments of red and blue-green algae
16. A plant cell undergoes plasmolysis if it is immersed in
17. The highest intensity of photosynthesis is observed in leaves
18. C₄ - the pathway of photosynthesis occurs in plants
19. Carotenoids reflect solar energy in the spectrum of waves
20. Constitutional macro element that is part of the chlorophyll molecule
21. The least resistant to spring frost in crops

Agropharmacology

1. Small-drop spraying with ground equipment is prohibited at wind speeds
2. Fumigants are used against
3. To combat mouse-like rodents, use the following drugs
4. Specific acaricides include
5. The use of fungicides of the triazole class during the growing season of cereal crops contributes to
6. Pesticides are used to protect sugar beet seedlings against weevils
7. Name the seed treatments against plant pathogens
8. In order to overcome resistance (resistance) in insect populations to insecticides, or a group of drugs of the same class of chemical compounds is necessary
9. Herbicides used on corn during the growing season are
10. Against late blight of potatoes during the growing season are used
11. Fungicides used on cereals to protect the flag leaf are
12. The following soil herbicides are used before or simultaneously with sowing sugar beet

- 13.It is forbidden to use pesticides on
- 14.Seed treatment with fungicidal preparations is carried out in order to
- 15.Combined preparations or mixtures of simple preparations are used for what purpose?

Entomology

- 1.Polyphagous pests
- 2.Pests of grain crops
- 3.Pests of leguminous crops
- 4.Pests of sugar beet
- 5.Pests of potatoes
- 6.Pests of cabbage crops
- 7.Pests of fruit crops
- 8.Pests of berry crops
- 9.Pests of grapes
- 10.Pests of warehouses, storerooms
- 11.Direction, including measures of biological method of plant protection
- 12.Pests against which the trichogram is used
- 13.Stage and place of wintering of the Swedish fly
- 14.The wintering stage of the common beet weevil
- 15.The nature of damage by the apple sawfly
- 16.What parts does the insect body consist of?
- 17.What family does the Colorado potato beetle belong to?
- 18.The nature of damage by pea weevils

Phytopathology

- 1.Causes of infectious diseases of plants
- 2.Partial or complete destruction of vegetative or reproductive organs of plants with their subsequent transformation into black spore mass occurs during
- 3.Do growths or galls appear on the affected plant organs as a result?
- 4.Do pads or pustules appear on leaves or other plant organs in the event of infection?
- 5.Smut sacs in the case of wheat smut pathogen (*Tilletia caries*) are formed from
- 6.The causative agent of wheat smut destroys
- 7.Measures effective against smut diseases of cereals
- 8.Measures effective against rust of cereals
- 9.The main diseases of sunflower in the northeastern forest-steppe of Ukraine
- 10.Measures effective against powdery mildew of cereals
- 11.Diseases of peas that are transmitted through seeds
- 12.Cercosporosis of beet
- 13.Root crops of beets are affected by
- 14.Late blight of potatoes
- 15.Bacterial diseases of potatoes
- 16.Effective measures against potato cancer
- 17.Peronosporosis of onions
- 18.Cabbage seedlings are affected by diseases

19.Sudden yellowing and death of plants and the death of cucumber crops before fruit set cause diseases

20.Apple tree scab

21.Diseases affecting stone fruit

22.Diseases whose pathogens are common to currants and gooseberries

Agriculture

1.Agriculture as a branch of agricultural production

2.Factors of plant life

3.What is an active soil layer?

4.The essence of the law of indispensability and equivalence of plant life factors

5.Soil particles are considered to be agronomically valuable

6.Irrigation rate is

7.The rate of drainage is called

8.What determines the limits of productivity of culture?

9.The potential yield is determined by

10.What yield is really possible?

11.What is a resource-supported crop yield?

12.Annual weeds are

13.What is the main advantage of biological weed control measures?

14.What is called a crop rotation scheme?

15.The best predecessors for winter wheat in the forest-steppe of Ukraine are

16.The term "tillage system" means

17.For which crops is deep plowing 28-32 cm used?

Soil science

1.Soil is

2.Soil monitoring is

3.Turf soil formation process is

4.Sod-podzolic soils are common

5.The type of soil is

6.Eroded soils are

7.Soil grading is

8.Land reclamation is

9.Soils of Polissya are

10.Malt is

11.Light soils are

12.Gray forest soils are mostly located

13.Soil and climatic zone in which the black soil is located regraded

14.Soils that can be formed on river terraces on alluvial deposits are

15.Black soils are leached

Agrochemistry

1.What is the form of mineral fertilizer

2.What is the active ingredient of fertilizers

3. Chemical compound (element) that is used to express the nitrogen content in plants, soils and fertilizers

4. What is the physiological acidity of fertilizer

5. What are physiologically acidic fertilizers?

6. What are physiologically alkaline fertilizers

7. How can ammonium nitrate be determined in a warehouse or field?

8. Chemical compound that is used to express the phosphorus content in plants, soils and fertilizers

9. What is a well-dissolved phosphate fertilizer in water

10. Chemical compound (element) that is used to express the content of potassium in plants, soils, and fertilizers

11. What are simple potash fertilizers?

12. What are compound fertilizers?

Vegetable growing

1. Cold-resistant vegetable crops

2. The most demanding vegetable crops for moisture

3. Vegetable crops that can be propagated generatively

4. Age of early cabbage seedlings

5. The required air temperature in the first 4-7 days after emergence when growing tomato seedlings

6. Plant density per 1 m² during the cultivation of pepper seedlings in a greenhouse, pcs.

7. Optimal plant density during the cultivation of carrots in the open field with a wide-band sowing method, million plants/ha

8. Onion seedlings are stored at a temperature of

9. Growing cucumbers in the open ground seeds are sown

10. Density of late white cabbage grown in the open field, thousand units/ha

11. Formation of plants of parthenocarpic cucumber hybrids on the main stem to a height of 50-60 cm from the soil surface

12. Harrowing on onion seedlings is carried out in the phase of

13. In the early spring, seeds are sown

14. Broadband method of sowing seeds

15. Sowing rate of onion seeds of the 1st class on turnip

16. Analysis and correction of the nutrient solution for the content of basic nutrients in the hydroponic method of growing vegetable crops is carried out

17. Bubbling of vegetable seeds is

18. Seedless method in the forest-steppe zone of Ukraine can be grown

19. What root crops can be grown by seedlings

Breeding and seed production

1. State seed resources are created for

2. The right to produce and sell original and elite seeds shall be granted to seed production and seedling production entities based on the results of certification conducted by

3. The right to produce and sell reproductive seeds to farms based on the results of certification conducted by

- 4.Methods of accelerated propagation of potatoes
- 5.Methods of accelerated propagation of perennial grasses
- 6.Approval traits of potatoes
- 7.When inspecting cereal crops determine
- 8.Varieties of winter wheat included in the state register for the Forest-Steppe zone
- 9.Barley varieties listed in the state register
- 10.Factors of deterioration of varietal qualities
- 11.Varietal purity is determined during testing
- 12.Pea varieties included in the State Register of Plant Varieties of Ukraine for the Forest-Steppe zone
- 13.Varieties of oats listed in the State Register of Plant Varieties of Ukraine for the Forest-Steppe Zone
- 14.Millet varieties included in the State Register of Plant Varieties of Ukraine for the Forest-Steppe Zone
- 15.Buckwheat varieties included in the State Register of Plants of Ukraine
- 16.Methods of fixing the effect of heterosis
- 17.Selection crops
- 18.Scheme of production of elite self-pollinated cereals (indicate the stages in chronological order)
- 19.Evaluation of combining ability of lines
- 20.Producers of seeds and planting material are obliged to
- 21.The renewal period (number of generations of reproduction) of the seeds produced shall be determined by
- 22.The system of seed production and seedling production consists of
- 23.Methods of accelerated reproduction of potatoes
- 24.Scientific support of seed production is carried out in the following areas
- 25.Difficulties of crosses of remote hybridization
- 26.Overcoming the non-crossability of distant hybrids
- 27.Producers of seeds and planting material are obliged to
- 28.Seeds and planting material shall be considered recognized if they
- 29.On which crops heterotic hybrids are widely used
- 30.What is meant by heterosis
- 31.Plant varieties included in the Register of Plant Varieties of Ukraine must meet the conditions
- 32.Types of sterility of corn
- 33.What types of corn hybrids are used in production
- 34.What is meant by introduction
- 35.Under the concept of variety understand
- 36.Topcross is
- 37.What is the difference between transgression and heterosis
- 38.Zones of Ukraine depending on the nature and intensity of potato degeneration
- 39.Zones of ecological zoning of seed production
- 40.Methods of creating self-pollinated lines
- 41.Selection crops
- 42.The concept of "State varietal control" includes

43. Different quality of seeds
44. The site of hybridization is
45. The scheme of elite production by the method of individual-family selection includes the following links

Fodder production

1. Groups of forage perennial grasses
2. A typical representative of sparsely bushy grasses
3. Typical representatives of high perennial legumes
4. The main agrotechnical measure used to radically improve natural fodder lands
5. Methods of alkalization for radical improvement of meadows
6. The most rational way of grazing cattle on cultivated pastures
7. What is sainfoin sown with?
8. Optimal terms of red clover use in field crop rotations
9. Seeding rate of conditioned seeds of fodder beet for the final density of planting
10. Characteristics of conditioned hay by color
11. Characteristics of conditioned hay by the content of inedible impurities (%)
12. Optimal acidity of silage by pH
13. Method of harvesting haylage
14. Classification of field lands is carried out by
15. Method of harvesting silage
16. Type and shape of the inflorescence of horned lambsquarters
17. Type and shape of the inflorescence of the meadow clover (red)
18. Type and shape of the inflorescence of seed alfalfa
19. Character of leaf margins of white sweet clover leaf
20. Type of leaf of meadow clover
21. Principles of composing grass mixtures for the forest-steppe of Ukraine
22. Types of perennial grasses common in the Forest-Steppe
23. The most common species of perennial grasses and legumes in Polissya
24. Lowland perennial grasses
25. Groups of fodder, which include root and tuberous fruits
26. Optimal plant density for the harvesting period for fodder beet
27. The basic principle of assembling a green conveyor
28. The highest seed productivity of perennial cereal grasses is in
29. The most effective way to harvest legumes and cereal perennial grasses for seeds
30. Name the main ways of intensification of fodder production
31. The main criteria for choosing a system of improvement of meadows are

Crop production

1. Basis for calculating potential yields
2. Indicators of moisture availability to determine the possible yield
3. Indicators of natural fertility to determine the possible yield
4. The programmed yield is determined by the following indicators
5. The optimal time for sowing sunflower
6. Sowing rate of winter rape by the usual row method with a row spacing of 15 cm

7. The best predecessors of buckwheat in the Forest-Steppe
8. Buckwheat reacts negatively to fertilizers, which include
9. Friendly germination of millet is observed at a temperature of 10 cm deep
10. Seeding rates of millet in the central Forest-Steppe with a conventional row sowing method
11. Indicate the numbers that indicate the forms of root crops in the figure
12. The best predecessors of spring barley
13. Recommended rates of organic fertilizers for sunflower in the forest-steppe zone
14. The best predecessors for winter rape
15. Place of application of organic fertilizers for winter rape
16. Botanical family to which buckwheat belongs
17. Seeding rate of buckwheat for wide-row sowing method
18. The main method of sowing barley
19. Sowing rate of barley in the Forest-Steppe and northern regions of the Steppe
20. When determining the sowing rate of winter wheat varieties (in million units/ha), the following are taken into account
21. Indicate the numbers that indicate the parts of the internal structure of the potato tuber in the figure
22. When determining the sowing rate of winter wheat varieties (in kg/ha), take into account
23. Field germination of early spring cereal seeds depends on
24. After the beginning of the spring growing season, provided that there are 180-200 winter wheat plants per 1 m², it is necessary to
25. If winter wheat has 150-180 plants per 1 m² left after wintering, it is necessary to
26. Indicate the numbers that indicate the inflorescences of millet in the figure
27. The best predecessors of winter wheat in the steppe zone of Ukraine
28. The best predecessors of winter wheat in the central forest-steppe
29. The formation of high-quality soft wheat grain that meets the requirements of "strong wheat" is influenced by
30. The formation of high brewing qualities of spring barley is influenced by
31. The timing of sowing winter wheat depends on
32. After harvesting red clover for grass flour in the right-bank regions of the central Forest-Steppe for winter wheat is carried out
33. After harvesting peas for grain on fields free from weeds, winter wheat is harvested
34. After harvesting corn for silage in milky-wax ripeness for winter wheat in the right-bank areas of the Forest-Steppe, the following is done
35. The best predecessors for growing corn for grain in the central Forest-Steppe
36. For the formation of optimal plant density during the cultivation of corn hybrids for grain it is necessary to take into account
37. Indicate the numbers that indicate in the figure
38. During the cultivation of corn for grain in the Forest-Steppe after winter wheat in the fall
39. Modern technology of growing corn for grain provides the following measures for the care of crops
40. In the case of growing grain corn in the Forest-Steppe after winter wheat, early spring and pre-sowing tillage includes
41. Indicate the numbers that indicate the panicles of sorghum in the figure

42. The reasons that hinder the growth of crop production at the present stage
43. Indicate the numbers on the figure indicate the main forms of carrot roots:
44. Signs of rice
45. Which of the following Latin names of genera belong to
46. Agricultural measures to regulate the light regime of plants
47. Characteristic features of sprouts, seedlings and leaves
48. The rules for soft winter wheat are the following statements
49. Sowing qualities of seeds
50. Nutrient crop
51. Insert in chronological order the phenological phases of growth and development of cereal crops
52. The measure of soil cultivation, which promotes germination of seeds of agricultural crops
53. Place the crops in ascending order of weight of 1000 seeds
54. Arrange the crops in order of increasing drought tolerance
55. Arrange the crops in order of increasing amount of moisture (%) required for seed germination
56. In which of the following crops rudimentary roots are stored for life
57. Place the crops in order of increasing frost resistance of their seedlings
58. In the fruits of which crops reserve substances accumulate in the endosperm
59. Place the crops grown in the Forest-Steppe in order of increasing their pre-harvest density, pcs/ha
60. Place the winter crops in order of increasing frost resistance
61. Which of the following crops are self-pollinated
62. Which of the following crops are cross-pollinated
63. Place the spinning crops in order of increasing average length of the elementary fiber

An example of a test task (for reference)

Agrochemistry

1. The form of mineral fertilizer is:

1. Characterization of the type of fertilizer by chemical composition. 2. Fertilizers of the same aggregate state. 3. Fertilizers containing the same plant nutrient.

2. The active ingredient is:

1. The main nutrient contained in a fertilizer. 2. An ion or group of ions that can be absorbed by plants. 3. A compound that is used to calculate the amount of nutrients in fertilizers.

3. The physiological acidity of the fertilizer is:

1. The ability of a fertilizer to acidify the reaction of the environment associated with nitrification of fertilizer nitrogen.

2. The amount of free acid in a mineral fertilizer. 3. The ability of the fertilizer to acidify the reaction of the environment, which is associated with the predominant use of cations from the composition of the corresponding salt by plants.

4. Compound fertilizers are:

1. Complex fertilizers produced by mechanical mixing of ready-made powdered, crystalline or granular single-component fertilizers.

2. Complex solid or liquid mineral fertilizers, in which all parts, crystals or granules are the same or similar in chemical composition.

3. Complex fertilizers obtained by mixing ready-made single-component fertilizers with the introduction of liquid and gaseous products.

Crop production

5. After the beginning of the spring growing season, if there are more than 200 evenly spaced plants per 1 m², it is necessary to carry out:

1. Sowing. 2. Sowing. 3. Do none of these activities.

6. After the beginning of the spring growing season, if there are 150-180 evenly spaced plants per 1 m², it is necessary to carry out:

1. Sowing. 2. Sowing. 3. Do none of these activities.

7. The best predecessors of winter wheat in the Forest-Steppe are:

1. Peas for grain. 2. winter wheat. 3. Corn of the Ministry of Internal Affairs

8. The best predecessors of winter wheat in the Steppe are:

1. Black vapor. 2. Corn of the Ministry of Internal Affairs. 3. Sorghum for grain

9. The best predecessors of winter wheat in Polissya are:

1. Corn of the Ministry of Internal Affairs. 2. Clover of the 1st mowing. 3. Fodder beets.

10. The timing of winter wheat sowing depends on the:

1. The length of the day. 2. air temperature conditions. 3. Methods of plowing.

11. Method of barley pollination

1. Cross. 2. Cross with partial self-pollination. 3. Self-pollinated.

12. The most common barley in Ukraine 1. Winter. 2. spring. 3. Two-handed.

13. Optimal temperature for germination of spring barley seeds at a depth of 10 cm:

1. 1–2 0C.
2. 10–12 0C.
3. 5–7 0C.

14. It is used for barley in areas of insufficient moisture and wind erosion:

1. Plowing with a ploughshare plow in a unit with rollers.
2. No moldboard tillage with post-harvest residues on the surface.
3. Loosening of the surface with subsequent plowing.

15. The sunflower has inflorescences: 1. Tassel. 2. A basket. 3. Panicle.

16. Method of sowing sunflower seeds:

1. Ordinary row with a row spacing of 15 cm.
2. wide row with a row spacing of 45 cm.
3. Wide-row with a row spacing of 70 cm.

Soil science with the basics of geology

17. Soil monitoring is:

1. A system of long-term observations of the weather and soil conditions in order to detect and predict any changes in a timely manner, and to develop measures to maintain and improve their fertility.
2. Covering the soil surface with various materials to reduce moisture evaporation.
3. The process of releasing saline soils and groundwater from easily soluble salts.
4. Diagnostics, forecasting and management of soil conditions to manage the extended reproduction of their fertility.

18. The turf soil formation process is:

1. A gradual deterioration of soil properties that causes changes in soil formation conditions, accompanied by a decrease in humus content, structural destruction, and reduced fertility.
2. Significant depletion of silt, physical clay and the bases of the upper horizons and their enrichment with silica. An acid reaction is formed, low humus content.
3. The process that develops under herbaceous vegetation, on rich carbonate rocks under atmospheric moisture conditions, during which humus and nutrients accumulate, creating a granular soil structure and its neutral reaction.
4. The process occurs under conditions of excessive moisture by surface or groundwater under specific moisture-loving vegetation.

Agrochemistry

19. Water-soluble phosphate fertilizers are:

1. Superphosphate
2. Precipitate
3. Phosphate rock
4. Open-hearth phosphate slag

20. A chemical compound (element) that is commonly used to express the content of potassium in plants, soils, and fertilizers: 1. K 3. K₂O 2. K⁺ 4. KOH

21. Simple potash fertilizers are: 1. Potassium chloride 2. Potassium sulfate 3. Potash 4. Cainite

22. Factors of plant life:

1. Water, heat, light, nutrients.
2. Water, heat, oxygen.
3. Light, heat, oxygen, water, nutrients.
4. Light, heat, air, water, nutrients.

23. The dry matter of plants contains the following nutrients:

1. Hydrogen, nitrogen, copper.
2. carbon, oxygen, hydrogen.
3. Carbon, oxygen, hydrogen, nitrogen.
4. Carbon, oxygen, hydrogen, phosphorus, nitrogen and other elements.

Plant physiology

24. Raising water up the tree trunk is provided by:

1. By the suction action of transpiration
2. by root pressure
3. by the continuity of water filaments
4. The combination of these phenomena

Ентомологія

25. Entomophages are used to protect plants from winter moths:

1. Aphelinus
2. Trichogramma
3. Encarsia
4. Macrolophus

26. Crop pests include:

1. Common leech
2. Wiry whitewort
3. Green grasshopper
4. Blood aphid

27. The ploughshare of the shelf plow is designed for:

1. Turn over and crush the soil clod.
2. Trimming the swath at the plowing depth and directing it to the shelf.
3. Maintaining straight line movement of the body.
4. Vertical cutting of the soil clod from the field.

Forage and grassland production

28. The main microbiological process during silage:

1. Lactic acid fermentation.
2. Alcoholic fermentation.
3. Fatty acid fermentation.
4. Protein oxidation.

29. The main ways to improve natural forage lands:

1. Accelerated
2. Superficial and fundamental
3. Superficial
4. Fundamental

- 30. Corn seeding rate per 1 ha (thousand units/ha)** 1. 50–70 2. 20–30 3. 200–400 4. 5–10

- 31. Seeding rate of meadow clover for cover crops (kg/ha)** 1. 5–10 2. 1–2 3. 20–25 4. 14–16

- 32. Seed for sandy sainfoin** 1. Pod 2. A member of the bean 3. Grain 4. Bean

33. Cover crop for perennial legumes

1. Peas
2. Corn for grain
3. Sunflower
4. Barley

Vegetable growing

34. The best types of tomato bushes for combine harvesting are the following:

1. Ordinary deterministic
2. Ordinary indeterministic
3. Stamp determinant
4. Strain indeterminate

Plant physiology

35. The maximum light absorption by chlorophyll is in the following part of the spectrum:

1. Red
2. Yellow
3. Green
4. Blue
5. Purple

Phytopathology

36. The spread of rust in grain crops is limited by preventive spraying of crops with fungicides:

1. Fundazole
2. Alto super
3. Vitavac
4. Acrobat MC
5. Impact

37. Single, and later numerous small gray spots with a red-purple border appear in the case of sugar beet leaves:

1. Phomosis
2. Peronosporosis
3. Bacterial cancer
4. Erysiphosis
5. Cercosporosis

38. Protection of sugar beet against rootworm includes the following measures:

1. Observance of crop rotation 2. Destruction of soil crust 3. Seed treatment 4. Spraying crops with fungicides 5. Destruction of weeds

39. Potato cancer is a disease:

1. Fungal
2. Bacterial
3. Viral
4. Mycoplasma
5. Not parasitic

40. Spots with a velvety olive bloom appear on the leaves and fruits of the apple tree if the trees are affected:

1. Moniliosis
2. scab
3. Powdery mildew
4. Black cancer
5. Phyllostictosis

Vegetable growing

41. Indicate which family the following vegetable crops belong to: radish and radish

1. Pumpkin
2. Celery
3. Onion
4. Cabbage
5. Astroflowers

42. The root system of the following crops is located in the surface soil layer:

1. Cucumber
2. Carrot
3. Parsnip
4. Salad
5. Seedling cabbage

43. They are the most demanding on water: 1. Carrot 2. White cabbage 3. Cucumber 4. Watermelon 5. Pepper

44. Depth of planting carrot and radish seeds

1. 1,5–2 cm
2. 2,5–3 cm
3. 3,5–4 cm
4. 4,5–5 cm
5. 5,5–6 cm

45. Indicate to which group the following vegetable crops belong in terms of heat requirements: Brussels sprouts and carrots

1. Frost-resistant 2. Cold-resistant 3. Semi-cold-resistant 4. Heat-loving 5. Heat-resistant 5.

46. Stealing of tomatoes is carried out for:

1. Improving plant lighting 2. Increasing the yield of bushes 3. Acceleration of fruit growth 4. Acceleration of fruit ripening 5. Activation of plant growth

47. The best types of tomato bushes for combine harvesting are the following:

1. Ordinary deterministic
2. Ordinary indeterministic
3. Stamp determinant
4. Strain indeterminate
5. There is no correct answer

48. What size group do celery and sorrel seeds belong to

1. Very small
2. Small
3. Medium
4. Large
5. Very large

Plant physiology

49. The most energy is released during breathing in the case of conversion:

1. Proteins
2. Fats
3. Carbohydrates

50. C-4 photosynthetic pathway got its name because:

1. It consists of four stages of sequential carbon dioxide reduction.
2. Four-carbon compounds are formed by carboxylation of the acceptor.
3. It is the fourth phase of photosynthesis.

Criteria for assessing the quality of knowledge of persons entering the specialty 201 "Agronomy" at the second (master's) level of higher education

The exam paper consists of test tasks in professional disciplines in the amount of 50 questions (4 points for each correct answer). When passing the exam, the applicant receives tasks and written work to mark the correct answers. The duration of the entrance exam is two academic hours.

Assessment criteria:

Table 1

Evaluation of a test case according to the number of correct answers

Number of correct answers	Points	Number of correct answers	Points
50	200	25	100
49	196	24	96
48	192	23	92
47	188	22	88
46	184	21	84
45	180	20	80
44	176	19	76
43	172	18	72
42	168	17	68
41	164	16	64
40	160	15	60
39	156	14	56
38	152	13	52
37	148	12	48
36	144	11	44
35	140	10	40
34	136	9	36
33	132	8	32
32	128	7	28
31	124	6	24
30	120	5	20
29	116	4	16
28	112	3	12
27	108	2	8
26	104	1	4