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УРОЖАЙНОСТЬ СЕМЯН РЫЖИКА В ЗАВИСИМОСТИ ОТ ПРИМЕНЕНИЯ РАЗЛИЧНЫХ ПРЕПАРАТОВ И СРОКОВ ПОСЕВА НА СЕВЕРЕ КАЗАХСТАНА

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Представлены результаты полевого опыта по влиянию микробиологических и химических средств защиты растений на продуктивность семян рыжика посевного. Препараты (обработка семян перед посевом произведена Экстрасолом, по вегетации – инсектицидом Протеус и фунгицидом Пиктор) изучены на фоне разных сроков посева (15–20 мая, 25–30 мая). В качестве контроля исследовали вариант без применения препаратов. Полевой опыт закладывали в четырехкратном повторении, площадь делянки 63 м^2. Способ посева – рядовой с нормой высева 6,0 млн всхожих семян/га. Предшественник – 1-я пшеница после пара. Работа проведена в 2018–2020 гг. в условиях Северного Казахстана. Объект изучения – семена, посевы рыжика посевного Исилькулец. Почва участка – чернозем, содержание гумуса – 2,50–3,89%, азота – 30,80–81,20 мг/кг, фосфора – 11–30 мг/кг, калия 620–770 мг/кг. Семена обрабатывали раствором Экстрасола из расчета 2 л (10 л рабочего раствора)/т семян в день посева. Рекомендован оптимальный срок посева рыжика (25–30 мая) и оптимальное сочетание препаратов с обработкой семян и опрыскиванием посевов фунгицидом. Выявлена продолжительность вегетационного периода рыжика в условиях Северного Казахстана, которая составила в среднем 72–81 день. Высокая продуктивность отмечена при применении микробиологического препарата Экстрасол (обработка семян) и опрыскивания посева фунгицидом Пиктор (11,5–16,0 ц/га). Достоверная ($НСР_{05}$ = 0,52) прибавка урожая семян составила 0,77 т/га. Установили, что обильные дожди в период вегетации способствуют развитию и распространению болезней (фузариоз: R = 14,3–21,5% и P = 27,5–86,4%; альтернариоз: R = 14,3–20,6% и P = 25,2–84,3%).

Ключевые слова: рыжик, срок посева, биологические и химические препараты, урожайность семян

CAMELINA SEEDS YIELD DEPENDING ON THE USE OF DIFFERENT PREPARATIONS AND SOWING DATES IN THE NORTH OF KAZAKHSTAN

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The results of a field experiment on the effect of microbiological and chemical plant protection agents on the productivity of camelina seeds are presented. The preparations (seed treatment before sowing was made with Extrasol, during vegetation - with insecticide Proteus and fungicide Pictor) were studied against the background of different sowing dates (15-20 May; 25-30 May). As a control, the version without the use of drugs was investigated. The field experiment was laid in quadruple repetition, the plot area was 63 m^2. The seeding method is row seeding with a seeding

rate of 6.0 million germinating seeds/ha. The forecrop is the 1st wheat after fallow. The work was carried out in 2018-2020 in the conditions of Northern Kazakhstan. The object of the study are the seeds and plantings of camelina Isilkulets variety. The soil of the site is chernozem, humus content - 2.50-3.89%, nitrogen - 30.80-81.20 mg/kg, phosphorus - 11-30 mg/kg, potassium 620-770 mg/kg. The seeds were treated with Extrasol solution at the rate of 2 l (10 l of working solution)/t of seeds on the day of seeding. The optimal seeding date for camelina (May 25-30) and the optimal combination of preparations with seed treatment and spraying of crops with fungicide are recommended. The duration of the growing season of camelina in the conditions of Northern Kazakhstan was revealed, which averaged 72-81 days. High productivity was noted with the microbiological preparation Extrasol (seed treatment) and spraying of crops with fungicide Pictor (11.5-16.0 c/ha). A significant (LSD_{05} = 0.52) increase in seed yield was 0.77 t/ha. It was found that abundant rains during the growing season contribute to increased development and spread of diseases (fusariosis: R = 14.3-21.5% and P = 27.5-86.4%; alternariosis: R = 14.3-20.6% and P = 25.2-84.3%).

Keywords: Camelina, sowing time, biological and chemical preparations, seed yield

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INTRODUCTION

Currently, there is a steady trend of expansion of sowing and production of oilseeds in Kazakhstan [1]. Cabbage crops occupy one of the leading positions in the world production of oilseeds. They successfully combine large potential yield with high content of oil and protein in seeds and provide a real opportunity for more rational use of plant resources due to enrichment of assortment of used species. Oilseeds production is one of the components of the agricultural industry, which provides industry with raw materials, and livestock - with fodder. The value of oilseeds is determined by the versatility of their use in the food industry, in agriculture and as a biofuel [2].

The promising oil-bearing crop camelina arouses great interest among agricultural producers. It successfully combines a high potential seed yield (up to 2.0 t/ha) with a high content of drying oil (36-40%) and protein (25-30%). Among the priority indicators of the quality of camelina seeds is the content of oil and protein. Studies by various authors have shown that the oil content in the seeds is about 40%, protein content is 30% [3].

Camelina is drought-resistant, with a growing season of 65-90 days, depending on the region of cultivation. It is undemanding to environmental conditions, has high ecological plasticity and can grow in a wide range of soil and climatic conditions. The plant is a good phytosanitary plant and forecrop for other crops. The early maturity is an important biological advantage of camelina, as it allows to significantly reduce the intensity of harvesting [4-6]. Therefore, the cultivation of camelina for oil seeds in the north of Kazakhstan is relevant.

The purpose of the research is to study the effect of microbiological, chemical preparations and timing of sowing on growth, plant development, spread of diseases and seed yield of camelina in the conditions of Northern Kazakhstan.

MATERIAL AND METHODS

Field experiments were laid in the experimental plot of "Kamenka and D" LLP, located in Sandyktau district of the Akmola region. The object of the research was the camelina variety Isilkulets. The effect of the combined application of biological and

chemical preparations (treatment of seeds with Extrasol before sowing, and by vegetation - with insecticide Proteus and fungicide Pictor), sown against different sowing dates (May 15-20; May 25-30) on the yield of camelina seeds was studied.

Extrasol is a safe preparation of exclusively biological origin, it improves the supply of nutrients to plants, increases seed germination, accelerates plant development, reduces plant infestation by phytopathogenic microorganisms, which significantly increases plant productivity. Pictor is a systemic combined fungicide containing two active substances (boscalid and dimoxystrobin) with different mechanisms of action on a wide range of rapeseed pathogens. Proteus is a new generation insecticide with systemic contact action, destroys pests at all stages of development (from eggs and larvae to the adult stage).

The variant without the use of preparations was used as a control. The seeding method was row seeding with a seeding rate of 6.0 million germinated seeds/ha. The forecrop was the 1st wheat after fallow. Minimum tillage was used in the experiments. No tillage was done after the previous crop and before sowing, the seeding was carried out by SZS-2.1 seeders. Harvesting was carried out by direct combine harvesters (Vector, etc.) in the phase of economic full ripeness, when the lower pods turn brown and the seeds in them harden.

According to the agrochemical survey of the experimental field soil was common chernozem, humus content 2.50-3.89%, nitrogen 30.80-81.20 mg/kg, phosphorus 11-30 mg/kg, potassium 620-770 mg/kg.

The hydrothermal coefficient in the years of research was from 0.75 in 2020 to 1.4 in 2018, the sum of positive temperatures above +10 ° C - 2295 °.

RESULTS AND DISCUSSION

The main limiting factor of yield in the area of experiments is moisture. The climate in the study area is sharply continental. This feature of the climate of Northern Kazakhstan was manifested in all the years of research, significantly affecting the productivity of camelina plants. During the growing season (from May to August inclusive) in 2018, 235 mm of precipitation fell, which amounted to 137% of the average annual rainfall. According to the value of the hydrothermal coefficient, 2018 is characterized as well-wetted (HTC = 1.4). In 2019 for the growing season precipitation was at the level of the norm (154 mm, which is 24 mm below the mean annual amount of precipitation), only in May precipitation was below the norm, in the third ten-day period of July - 3.5 times less than the mean annual rates. According to the value of the hydrothermal coefficient, the year is characterized as dry (HTC = 0.77). In 2020 during the growing season precipitation amounted to 177.5 mm, which was 95% of the average annual amount of precipitation. According to the value of the hydrothermal coefficient 2020 is characterized as dry (HTC = 0.75). Distribution of precipitation during the growing season was uneven. Thus, in 2018 their main amount was in the whole August (102 mm), in 2019 - in the II ten-day period of June, III ten-day periods of July and August (149-232% of the average annual amount of precipitation). The sum of positive temperatures for the growing season 2018 was above the norm, in 2019, 2020 - below the norm by 66-328°.

The onset of the main phenological growth phases of camelina in the years of the study depended on both the studied agricultural practices and the weather conditions (see Table 1).

In the late crops the onset of the interphase periods sowing - sprouting and sprouting - branching took place 1-2 days earlier than in the early crops. The data obtained show that, on average, the duration of the interphase period sowing - sprouting was 7-10 days. This period was characterized by average daily air temperature of 11.7-13.9 °C and the sum of precipitation from 6.3 to 24 mm.

The length of the interphase period sprouting - flowering is one of the main, because at this time there occurs the growth of the vegetative mass. When a certain amount of temperatures is reached, one phase of plant development is replaced by the next [7, 8]. If it took on average

Табл. 1. Даты наступления основных фаз роста и развития рыжика, среднее за 2018–2020 гг.
Table 1. Dates of the main phases of growth and development of camelina, average for 2018-2020

Option	Sprouts	Branching	Flowering	First pod formation	Full ripeness
Sowing dates 15-20 May					
Control	28 May	13 June	29 June	16 July	7 August
Extrasol	26 May	10 June	26 June	13 July	4 August
Extrasol + Pictor	26 May	10 June	26 June	13 July	4 August
Extrasol + Proteus	26 May	10 June	26 June	13 July	4 August
Sowing dates 25–30 May					
Control	6 June	20 June	5 July	20 July	11 August
Extrasol	4 June	18 June	3 July	18 July	8 August
Extrasol + Pictor	4 June	18 June	3 July	18 July	8 August
Extrasol + Proteus	4 June	18 June	3 July	18 July	8 August

61,5-261,8° of the sum of positive temperatures to pass the first period of sowing - sprouting when sowing on May 15-20, the period from sprouting to flowering took on average 347,1-890,1°. As a result, the duration of sprouting - flowering period averaged 28-32 days.

Observations have shown that camelina finishes the interphase period of flowering - full ripeness in 35-40 days, depending on the hydrothermal conditions.

In our studies, the shortest period of flowering - full ripeness was observed in 2019 (with average daily temperature of 19.3 °C and precipitation of 60 mm) and the longest - in 2018 (with temperature of 16.7 °C and 127 mm). This is explained by the fact that high average daily temperatures and lack of moisture lead to a shortening of this period and, conversely, lower temperatures in combination with abundant precipitation contribute to its increase.

Camelina is an early maturing crop. Despite the great role of individual periods of plant growth and development, the duration of the entire growing season is decisive in the economic evaluation of the variety. The growing season is one of the main biological traits in plant breeding and is crucial for high yields. It is one of the means of plant adaptation to habitat conditions, which is determined by genetic characteristics and the totality of the environment [9].

On average, the growing season of camelina was 75-81 days. At the sowing date of May 15-20, this figure was 5-6 days shorter than at sowing on May 25-30. The longest vegetation period of camelina (89-102 days) was observed in 2018 under relatively cool and rainy weather (HTC = 1.4). In 2019, under dry conditions, the duration of the growing season of camelina decreased to 64-67 days (HTC = 0.77). The duration of the growing season as a whole and the individual interphase periods of development of camelina plants depended on the varietal characteristics and growing conditions (see Table 2).

Under conditions of excess moisture and low air temperature, the duration of the growing season increases and, conversely, under conditions of drought, the period from sprouting to maturity decreases sharply. Observations suggest that camelina has a relatively short growing season, which is one of the main positive biological qualities of the crop. Thanks to this property, the development of culture occurs in the best conditions for the provision of moisture. It ripens much earlier than other crops.

Over the years of research, the duration of the growing season of the crop was influenced by the use of microbiological preparation, as well as the sowing period. It averaged 72-81 days, at a late sowing date a decrease in this period by 5-6 days was observed.

Phytosanitary condition of crops at any level of agrotechnics is in a certain dependence on climatic conditions of the area and the weather, which is established in the period from seedlings to maturity of seeds. At the same time, especially noticeable influence on this indicator have moisture and heat regime during the growing season. Camelina, unlike other crops of the cabbage family, is practically not infested by pests and not affected by diseases. At a time of constant increases in energy and pesticide prices this makes it possible to significantly reduce the level of costs for its cultivation. Infestation of culture by various fungal diseases directly depends on climatic and weather conditions. In laboratory and field studies, scientists found symptoms of Alternaria and Fusarium infestation. Leaves, stems and pods are affected [10]. Meteorological conditions in the years of research differed from the average annual data, as well as by decade and month as a whole, which made it possible to comprehensively assess the effectiveness of various drugs against the diseases.

In our studies of phytosanitary conditions in camelina crops, the amount of precipitation and temperature regime had a significant impact. Thus, in 2018 weather conditions were favorable for the development of fungi of the genus Fusarium and Alternaria. Reduced average daily air temperature, good soil moisture in the III ten-day periods of May and June, as well as abundant precipitation in the I and II ten-day periods of August contributed to the infestation of camelina plants with diseases.

The combined use of seed treatment and fungicide treatment of crops in the hearted state against Fusariosis and Alternariosis significantly stopped the development and spread of the diseases and kept them in check until the phase of the formation of the first pods. Low precipitation in 2018 (8 mm, or 44% of the mean annual data) with the temperature regime at the level of the long-term average annual also contributed to this. In early August, heavy rains occurred (256% of the mean annual data) and the dynamics of development and spread changed dramatically towards an increase in diseases (Fusariosis: R = 14.3-21.5% and P = 27.5-86.4% Alternariosis: R = 14.3-20.6% and P = 25.2-84.3%). Compared with the control variant, a significant reduction in the development and spread of diseases was observed in the variant with the fungicide Pictor. Weather conditions

Табл. 2. Продолжительность основных межфазных периодов роста и развития рыжика, среднее за 2018–2020 гг., день

Table 2. Duration of the main interphase periods of growth and development of camelina, average for 2018-2020, day

Option	Sowing - sprouting	Sprouts– branching	Branching–flowering	Flowering–full ripeness	Vegetation period
Sowing dates 15-20 May					
Control	10	16	16	39	81
Extrasol	8	15	16	39	77
Extrasol + Pictor	8	15	16	39	77
Extrasol + Proteus	8	15	16	39	77
Sowing dates 25–30 May					
Control	9	14	15	36	75
Extrasol	7	13	15	36	72
Extrasol + Pictor	7	13	15	36	72
Extrasol + Proteus	7	13	15	36	72

in 2019 and 2020 were similar (HTC = 0.77 and 0.75). Thus, in 2019 during the growing season of the crop, little precipitation and a high temperature background were observed, which caused a slow increase in the disease. In such years, the development and spread of diseases decreased in all the growth phases and development of the crop compared to 2018.

The crop yield is determined by its main elements: the number of plants per unit area, productive bushiness, the number of grains per plant and the weight of 1000 seeds. The conditions for their most successful development depend on the temperature and water regimes, availability of mineral nutrients, as well as on technological methods of cultivation.

The yield of camelina in the years of research was significantly influenced by both the prevailing weather conditions during the growing season of the crop, and the timing of the seeds sowing. Camelina yield from the combined use of microbiological and chemical preparations increased in comparison with the variant without their use (see Table 3).

Thus, when dressing the seeds before sowing, the yield of camelina increased at the sowing date of May 15-20 compared with the control variant by 2.8 c/ha, and with additional spraying of crops with fungicides - by 3.8 c/ha and insecticides by 1.2 c/ha. A similar pattern was found in the variant with the sowing date of May 25-30 and was, respectively, 5.4; 7.7 and 6.5 c/ha.

The yield differed significantly between the early and later sowing dates, at sowing in May 25-30 it varied from 8.3 to 16.0 c/ha, which is by 0.4-4.5 c/ha higher than in the variant with the sowing date of May 15-20. At the same time, sowing of seeds treated with Extrasol and application of fungicide Pictor during the vegetation period of camelina contribute to obtaining higher seed yields than in other variants, regardless of the sowing dates.

Табл. 3. Влияние применения разных препаратов и сроков посева на урожайность семян рыжика в 2018–2020 гг.

Table 3. Effect of the use of different preparations and seeding dates on the yield of camelina seeds in 2018-2020

Sowing date	Preparation	Yield, c/ha
15–20 May	Control	7,9
	Extrasol	10,5
	Extrasol + Pictor	11,5
	Extrasol + Proteus	9,1
LSD_{05}		0,52
25–30 May	Control	8,3
	Extrasol	13,7
	Extrasol + Pictor	16,0
	Extrasol + Proteus	14,8
LSD_{05}		0,54

CONCLUSIONS

1. As a result of the research it was found that the duration of the growing season of camelina in the conditions of Northern Kazakhstan is 72-81 days. The optimal sowing date of sowing camelina is the III ten-day period of May, which provides the maximum seed yield of 13.7-16.0 c/ha, which is 23-28% higher compared to the earlier sowing date (15-20 May).

2. The optimal efficiency is provided by the combined use of preparations with seed treatment Extrasol and spraying of crops with fungicide Pictor, it contributes to obtaining the yield by 2.4-2.8 c/ha higher than in the variant with the seed dressing before sowing and insecticide Proteus during the growing season. Sowing with dressed seeds and spraying of camelina with fungicides during the vegetation period against diseases increases the yield by 1.4-1.9 times compared to the variant without their application.

3. Over the years, studies have shown that the use of combined treatment of seeds with preparations and seeds with fungicides reduces the development and spread of diseases to the phase of the formation of the first pods.

СПИСОК ЛИТЕРАТУРЫ

1. *Тулькубаева С.А., Васин В.Г.* Формирование урожайности и качество семян ярового рыжика при использовании регуляторов роста // Известия Самарской государственной сельскохозяйственной академии. 2017. № 2. С. 3–7.

2. *Кузнецова Г.Н., Лошкомойников И.А., Кривошлыков К.М.* Экономическая эффективность возделывания масличных культур в Омской области // Масличные культуры. 2021. Вып. 3 (187). С. 53–57.
3. *Конькова Н.Г., Малышев Л.Л., Асфандиярова М.Ш.* Исходный материал для селекции ярового рыжика (*Camelina sativa* (L.) Crantz.) в условиях Астраханской области // Масличные культуры. 2020. Вып. 3 (183). С. 75–83.
4. *Кузнецова Г., Полякова Р.* Сурепица и рыжик – скороспелые масличные культуры // Международный сельскохозяйственный журнал. 2017. № 3. С. 44–46.
5. *Шевцова Л.П., Шьюрова Н.А., Каленюк А.В.* Агробиологические особенности и продуктивность традиционных и редких видов масличных культур в засушливом Поволжье // Нива Поволжья. 2008. № 4 (9). С. 36–39.
6. *Аринов К.К., Мусынов К.М., Апушев А.К., Серекпаев Н.А., Шестакова Н.А., Арыстангулов С.С.* Растениеводство: монография. Алматы: Ассоциация вузов МОН РК, 2011. 631 с.
7. *Семенова Е.Ф., Буянкин В.И., Тарасов А.С.* Масличный рыжик: биология, технология, эффективность: монография. Волгоград: Изд-во ВолГУ, 2007. 78 с.
8. *Прахова Т.Я.* Рыжик посевной (*Camelina sativa* (L.) Grantz): монография. Пенза: РИОПГСХА, 2013. 209 с.
9. *Вавилов Н.И.* Ботанико-географические основы селекции (Учение об исходном материале в селекции): монография. М.: Колос, 1966. С.176–225.
10. *Zahoor Ahmad Mir, Sajad Ali, Shivaraj S.M., Javaid Akhter Bhat, Apekshita Singh, Prashant Yadav, Sandhya Rawat, Pradeep K. Paplao, Anita Grover.* Genome-wide identification and characterization of Chitinase gene family in Brassica juncea and Camelina sativa in response to Alternaria brassicae // Genomics. 2020. Т. 112. № 1. С. 749–763.

REFERENCES

1. Tul'kubaeva S.A., Vasin V.G. Crop capacity forming and spring false flax seeds quality by use of growth regulators. *Izvestiya Samarskoj gosudarstvennoj sel'skohozyajstvennoj akademii = Bulletin Samara State Agricultural Academy,* 2017, no. 2, pp. 3–7. (In Russian).
2. Kuznecova G.N., Loshkomojnikov I.A., Krivoshlykov K.M. Economic efficiency of cultivation of oil crops in the Omsk region. *Maslichnye kul'tury = Oil crops*, 2021, is. 3 (187), pp. 53–57. (In Russian).
3. Kon'kova N.G., Malyshev L.L., Asfandiyarova M.SH. Germplasm material for false flax (*Camelina sativa* (L.) Crantz.) breeding in the conditions of the Astrakhan region. *Maslichnye kul'tury = Oil crops,* 2020, is. 3 (183), pp. 75–83. (In Russian).
4. Kuznecova G., Polyakova R. Barbarea and camelina – early maturing oilseeds. *Mezhdunarodnyy sel'skokhozyaystvennyy zhurnal = International Agricultural Journal, 2*017, no. 3, pp. 44–46 (In Russian).
5. Shevtsova L.P., Sh'yurova N.A., Kalenyuk A.V. Agrobiological features and productivity of traditional and rare types of oilseeds in the arid Volga region. *Niva Povolzh'ya = Volga Region Farmland*, 2008, no. 4 (9), pp. 36–39. (In Russian).
6. Arinov K.K., Musynov K.M., Apushev A.K., Serekpaev N.A., Shestakova N.A., Arystangulov S.S. *Plant growing.* Almaty, Association of Universities of the Ministry of Education and Science of the Republic of Kazakhstan Publ., 2011, 631 p. (In Russian).
7. Semenova E.F., Buyankin V.I., Tarasov A.S. *Oil camelina: biology, technology, efficiency.* Volgograd, VolGU Publishing House, 2007, 78 p. (In Russian).
8. Prakhova T.Ya. *Sowing mushroom (Camelina sativa* (L.) *Grantz).* Penza, RIOPGSKhA Publ., 2013, 209 p. (In Russian).
9. Vavilov N.I. *Botanical and geographical bases of breeding (The doctrine of the source material in breeding).* Moscow, Kolos, 1966, pp. 176–225. (In Russian).
10. Zahoor Ahmad Mir, Sajad Ali, Shivaraj S.M., Javaid Akhter Bhat, Apekshita Singh, Prashant Yadav, Sandhya Rawat, Pradeep K. Paplao, Anita Grover. Genome-wide identification and characterization of Chitinase gene family in Brassica juncea and Camelina sativa in response to Alternaria brassicae. *Genomics*, 2020, vol. 112, no. 1, pp. 749–763.

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ПРАВИЛА ДЛЯ АВТОРОВ

Правила для авторов составлены на основе этических принципов, общих для членов научного сообщества, и правил публикации в международных и отечественных научных периодических изданиях, а также в соответствии с требованиями ВАК для периодических изданий, включенных в Перечень российских рецензируемых научных журналов, в которых должны быть опубликованы основные научные результаты диссертаций на соискание ученой степени доктора и кандидата наук.

Журнал публикует оригинальные статьи по фундаментальным и прикладным проблемам по направлениям:

- общее земледелие и растениеводство;
- селекция, семеноводство и биотехнология растений;
- агрохимия, агропочвоведение, защита и карантин растений;
- кормопроизводство;
- инфекционные болезни и иммунология животных;
- частная зоотехния, кормление, технологии приготовления кормов и производства продукции животноводства;
- разведение, селекция, генетика и биотехнология животных;
- технологии, машины и оборудование для агропромышленного комплекса;
- пищевые системы.

Статья, направляемая в редакцию, должна соответствовать тематическим разделам журнала «Сибирский вестник сельскохозяйственной науки»:

Наименование рубрики	**Шифр и наименование научной специальности в соответствии с Номенклатурой научных специальностей, по которым присуждаются ученые степени**
Земледелие и химизация	4.1.1. Общее земледелие и растениеводство 4.1.3. Агрохимия, агропочвоведение, защита и карантин растений
Растениеводство и селекция	4.1.1. Общее земледелие и растениеводство 4.1.2. Селекция, семеноводство и биотехнология растений
Защита растений	4.1.3. Агрохимия, агропочвоведение, защита и карантин растений
Кормопроизводство	4.1.1. Общее земледелие и растениеводство 4.1.2. Селекция, семеноводство и биотехнология растений 4.1.3. Агрохимия, агропочвоведение, защита и карантин растений
Зоотехния и ветеринария	4.2.3. Инфекционные болезни и иммунология животных 4.2.4. Частная зоотехния, кормление, технологии приготовления кормов и производства продукции животноводства 4.2.5. Разведение, селекция, генетика и биотехнология животных
Механизация, автоматизация, моделирование и информационное обеспечение	4.3.1. Технологии, машины и оборудование для агропромышленного комплекса
Переработка сельскохозяйственной продукции	4.3.3. Пищевые системы
Проблемы. Суждения Научные связи Из истории сельскохозяйственной науки Краткие сообщения Из диссертационных работ	4.1.1. Общее земледелие и растениеводство 4.1.2. Селекция, семеноводство и биотехнология растений 4.1.3. Агрохимия, агропочвоведение, защита и карантин растений 4.2.3. Инфекционные болезни и иммунология животных 4.2.4. Частная зоотехния, кормление, технологии приготовления кормов и производства продукции животноводства 4.2.5. Разведение, селекция, генетика и биотехнология животных 4.3.1. Технологии, машины и оборудование для агропромышленного комплекса 4.3.3. Пищевые системы

В журнале также публикуются обзоры, краткие сообщения, хроника, рецензии, книжные обозрения, материалы по истории сельскохозяйственной науки и деятельности учреждений и ученых.

Число публикаций одного автора в номере журнала не должно превышать двух, при этом вторая статья допустима лишь в соавторстве.

К рассмотрению принимаются материалы от различных категорий исследователей, аспирантов, докторантов, специалистов и экспертов в соответствующих областях знаний.

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