COMPARATIVE STUDIES OF THE CHEMICAL COMPOSITION OF SELECTED BARLEY VARIETIES FROM THE MAIN GRAIN-BEARING SOUTH-EAST OF KAZAKHSTAN

Abstract

Barley in Kazakhstan in terms of sowing area ranks second after wheat among grain crops. Barley is a culture of versatile use. Most of the barley grain harvest is used for animal husbandry, as well as for the preparation of various types of cereals and is the main raw material for the brewing industry in Kazakhstan.

An increase in grain production in the Republic also depends on the production of grain forage crops, which have great biological potential, high nutritional and fodder values. With the active development of animal husbandry and the processing industry in Kazakhstan, the demand for barley grain has increased. However, the need for seeds of malting barley in Kazakhstan is provided by no more than 30-40%, the same situation is similar to the provision of fodder barley grain for animal husbandry. In this regard, the developed concept for the development of the agro-industrial complex of the Republic of Kazakhstan involves the diversification of crop industries, the expansion of sown areas for profitable agricultural crops, in order to obtain high-quality, competitive products, which include grain forage crops.

The results of the research made it possible to identify varieties of cereal crops with the highest nutritional value. The content of the mass fraction of protein in the grain of barley of domestic breeding varieties was determined. Barley contains more than 11% protein, which is superior in nutritional value to wheat. Vegetable protein is absorbed by our body by almost 100%. Next, the carbohydrate content was determined. The basis of the human energy source, which is the most complex chemical component of the human diet. In this regard, the content of the carbohydrate complex of selected grain varieties was further studied in terms of the content of starch in the chemical composition and extractivity. Next, we studied the content of the mass fraction of protein, which was obtained when converted to the actual moisture content of barley grain. As a result of the research on the study of the chemical composition of selected samples of barley grain of domestic breeding varieties, the percentage of protein, carbohydrates (starch) and extractivity was established. Conclusions As a result of the research, it was established to identify varieties of cereal crops with the highest nutritional value, which must be taken into account when developing recipes for poly-cereal mixtures for food production.

Key words: chemical composition, grain, wheat, barley, mass fraction of protein, starch, fiber, humidity.

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HARMFUL PESTS AND BIOLOGICAL PROTECTION OF AGRICULTURAL CROPS (WHEAT, SOY, CORN) IN THE CONDITIONS OF THE ALMATY REGION

Abstract

In a number of Programs for the development of the industry, outlined in the President's Messages (2017,2018, 2017-2021), it is indicated that one of the most important problems of agricultural production in our country is the transition to a new paradigm based on increasing its efficiency through the introduction of an ecosystem development path. This transition consists in the production of organic farming and the production of environmentally friendly products that are harmless to animals and the population. Therefore, the results of scientific research presented in this article on the development of agrotechnologies and the introduction of an ecologized set of protective measures against harmful organisms into production are an important foundation in solving the production of environmentally friendly (organic) products.

This article presents the results of the application of biological protection against pests of agricultural crops. In the ecological aspect, the pesticide load on the cultivated area and the environment is reduced, compaction and soil pollution occur to a lesser extent, due to a reduction in the number of passes of equipment through the field. During the monitoring, harmful pests of agricultural crops (wheat, soy, corn) were encountered and biological protection was applied to them in the conditions of the Almaty region.

During the growing season, during soil excavations and population counts, 11 species of pests were found on alfalfa, esparcet and soybeans, 7 on corn, 15 on wheat and barley, 8 on rapeseed and flax. The biological efficacy of drugs and entomophages against cotton scoops (*Helicoverpa armigera Hb*.) on corn crops showed high biological efficacy on the seventh day was 91.5-95.1%, and on the 14th day, due to the release of bioagents, the effectiveness was at the level of 77.6-82.1%. Against the spider mite on the 7th day of accounting, the biological effectiveness was 86.3–87.3%, due to the release of the entomophage chrysoglazka, the effectiveness was at the level of 81.2-81.5%.

Key words: *Wheat, soy, corn, pests, biological protection, pesticide, organic*

Introduction

The world agriculture purposefully makes the transition to a new paradigm based on increasing its efficiency by switching to an ecosystem path of development. One of the ways of such development is organic agriculture, which is actively gaining momentum. Organic agriculture is a holistic production system that supports the health of soils, ecosystems and people [1].

The introduction of chemicals into agriculture has delighted many at the sight of what they can achieve. The technology for the use of chemicals has spread all over the world, as it was considered a revolution in agriculture. And today, many people will again admire organic farming. This is after we learned that traditional farming methods are fraught with many problems, including health-related diseases such as cancer, environmental pollution, soil and water degradation, as well as exposure to pets [2].

Organic farming protects the environment and has a greater socio-economic impact on the nation. India is a country endowed with local skills and potential for growth in organic agriculture. Although India has lagged far behind in the development of organic farming for several reasons, it has now achieved rapid growth in organic agriculture and is now becoming one of the largest producers of organic products in the world [3].

The strategy of the future organic farming will become a key tool in this regard and will be adapted and expanded to achieve new goals [4, 5].

The benefits of organic farming for the ecosystem include preserving soil fertility, preserving the landscape and preserving biodiversity. Organic farming is characterized by a higher diversity of arthropod fauna and preservation of natural entomophages than in traditional agriculture [6,7,8].

Methods and materials

When performing the work, both classical methods adopted in entomology, phytopathology, herbology and plant protection were used, as well as their own original modifications of the soil trap [9, 10, 11]. During monitoring, in order to obtain the number of pests, the repetition and representativeness (regular placement) of accounting samples will be observed, ensuring random sampling and placement of samples of sufficient volume. In cases where the spatial distribution of pests is clearly heterogeneous, the fields will be divided into sections and evaluated by 5 samples in 2-4 places of the field. Different accounting methods will be used for different crops and their pests.

Visual (eye-measuring) accounting is used for openly living, visually accessible and relatively sedentary pests. There are two forms of this accounting: in trial sites (1 m), usually used on continuous crops, the estimate is n/1 m2; and on trial plants or their accounting parts (shoot, leaf), estimates are n/1 plant and % of populated plants. Insects (harmful turtle, pyavitsa, imago of bread beetle, bread beetles, imago and larvae of the Colorado beetle, lepidoptera caterpillars) are taken into account on sites with a size of 0.25 m2, for example, using a square frame of 0.5 x 0.5 m. one sample is taken on average for 5 hectares of crops, 20 samples are placed on 100 hectares. Small and jumping insects (fleas) with the same number of samples are taken into account using a gauze-covered box Loop with a size of 50 x 50 cm in the lower base, superimposed on the soil.

On row crops, pest population measurements are carried out on segments of a row with a length of 25-100 cm, followed by conversion to an area of 1 m2. At the same time, 20 samples of 5 plants or 10 samples of 10 plants are taken, placing them along the intersecting diagonals of the field. Sedentary insects (for example, fruit weevils in cool weather) will be detected by shaking on a tarpaulin or film per 1 tree (bush) in 20-fold repetition.

Small insects and mites in the field are evaluated by two indicators: the percentage of inhabited plants and the settlement score. The population is characterized by a 3-point scale: 1 point – weak population (there are individuals on the plant that do not form colonies and inhabit less than 25% of the leaf surface); 2 points – average population (1-2 colonies inhabiting 26-50% of the leaf surface are found on the plant); 3 points – strong population (on the plant there is more than 2 colonies inhabiting more than 50% of the entire leaf surface). If necessary, small insects and mites are counted in the laboratory under a binocular microscope, in this case it is advisable to select from 50 to 100 leaves from the analyzed area.

Soil excavations are used to account for soil-dwelling pests and phases of development resting in the soil. In the test sites (0,25m2), the soil is selected and viewed with the counting of individuals. The excavation depth is determined by a specific object, as standard - up to 30 cm. Excavations, for example, locust pods, meadow moth cocoons, caterpillars gnawing the scoop are carried out to a depth of up to 10 cm, wireworms - to a depth of 30-35 cm. The estimate is n / 1 m2.

Accounting for hidden stem pests is used for harmful phases located inside plants. Sample plants or their parts (shoots, stems) are selected, opened and viewed, pests and traces of their damage are counted. Usually 10 samples are taken with an area of 0.25 m2. The method is applied to the larvae of cereal flies, cereal stem fleas, bread sawflies, stem moth, cabbage stem skrytnohobotnik. Estimates - n/1 plant, % of inhabited plants.

Mowing with an entomological net is used to account for pests that live openly, but are inaccessible for visual counting due to high mobility or excessively high numbers or thickening of the herbage. For one sample, 10-20 swings of the net are taken without interruption - 5-10 samples are taken in total so that in total they include 100 swings. Next, the insects previously immobilized in the stain are counted. The score is n/ 100 strokes of the net.

Records with the help of traps will be used for a variety of insects that are difficult to directly observe. Use traps without baits (soil) and with special baits (light, color, food, pheromone). Regularly placed traps are examined at regular intervals. In the garden, pheromone traps are placed at a distance of at least 100 m from each other, males are counted every 1-2 days. Small flying insects are caught with centrifuge or suction traps. On an area of 5 hectares, 1-2 traps are installed. The standard estimate is n/100 traps-days.

The calculation of the biological effectiveness of the drug is carried out according to the Abbott formula.

$E = 100 – (b : a) x 100$,

where, E is the effectiveness of the drug, expressed as a percentage of the reduction in the pest population relative to control;

b – the number of pests in the experiment on the day of accounting;

a - the number of pests in control on the day of registration.

Results and discussion

In this regard, the development of organic farming technologies for the cultivation of agricultural crops, including protecting against a complex of harmful organisms, is an urgent task. During the growing season, during regular monitoring of soil excavation pests and population counts on rapeseed, there are 8 types of pests: leaf beetles (*Chrysomelidae*), caterpillars (*Papiliomachaon*), moths (*Tineola bisselliella*), whiteflies (*Pieris*), rapeseed sawfly (*Athalia rosae*), cruciferous fleas (*Phyllotreta cruciferae*), cruciferous bugs (*Eurydema*), aphids (*Aphidoidea*).

11 species of pests have been found on soybeans: seed nutcracker (*Agriotes sputator* L.), broad nutcracker (*Selatosomus latus* F.), steppe medlyak (*Blaps halophila* M.), nodule weevils: striped (*Sitona lineatus* L.) and bristly (*S.crinitus* Hbst.), green cicada (Cicadella viridis L.), red-legged softweed (*Cantharis rustica* L.) clover scooper (Discestra trifolii Hufn.), Turkestan spider mite (*Tetranychus turkestanicus* Ug et.Nik), soy fruit moth (*Legumini voraglicinivorella* Mtsm.), brown-marbled bug (*Halyomorpha halys* (Stal, 1855).

8 species of pests have been recorded on corn: seed nutcracker (*Agriotes sputator* L.), dark nutcracker (*Agriotes obscurus* L.), steppe medlyak (*Blaps halophila* M.), sand medlyak (*Opatrum sabulosum* L.), meadow moth (*Loxosteqe sticticalis* L.), corn stem moth (*Pyraustanubilalis* Hb.), corn hollow (*Pentodon idiota* Herbst), cotton scoop (*Helicoverpa armigera*).

On wheat and barley, 15 types of pests were damaged to varying degrees: nutcrackers: seed (*Agriotes sputator* L.), dark (*Agriotes obscurus* L.), broad (*Selatosomus latus* F.), steppe slowworm (Blaps halophila M.), sandy slowworm (Opatrum sabulosum L.), bread striped flea (*Phyllotreta vittula* R.),red-breasted piavica (*Oulema melanopus* L.), wheat thrips (*Haplothrips tritici* Kurd.), Moor bug (*Eurygaster maura* L.), common grass aphid (*Schizaphis graminum* Rond), large grass aphid (*Sitobion avenae* F.), grass flies: green-eyed (*Chlorops pumilionis* Bjer.), Meromyza bread (*Meromyza nigriventris* Mcq.), large bread flea (*Chaetocnema aridula* Gyll.), small bread flea (*Chaetocnema hortensis* Geoffr.).

In July, a dangerous pest was found on corn - the cotton scoop (*Helicoverpa armigera*), the number of up to 8-9 caterpillars per 100 plants, with a threshold of 10-20 caterpillars per 100 plants, which does not exceed the EPV. And also a marginal lesion of an ordinary spider mite (*Tetranychus urticae* Kosh) was noted on soybeans – 12-17 copies / leaf, which exceeds the EPV (10-12 copies / leaf).

Corn in the phase of flowering and grain filling is the most important food resource for the caterpillars of the cotton scoop (*Helicoverpa armigera* Hb.) of the second generation. Despite the differences in weather conditions in the period preceding the birth of second-generation butterflies from pupae, their flight in all years was observed in the last five days of June. There were no significant differences in the dates of the mass summer of butterflies by year, the mass summer was observed in the first decade of July.

The preferred place for laying eggs was the upper side of the leaf blade, but eggs were also found on the underside of the leaves, on the wrappers and threads of the ears, as well as panicles. The first caterpillars in our experiments were found in the time interval of July 10-15, and the mass hatching of caterpillars began from the second decade of July (by years from July 13-18). So the transition from egg laying to hatching of caterpillars in different years lasted 7-14 days, while the average daily air temperature at its maximum and minimum duration was at the same level. The sum of the average daily temperatures was determined by the duration of the period. There is also no clear pattern of the effect of precipitation on the duration of the period from oviposition to hatching of caterpillars. However, it was noticed that with the least amount of precipitation (4 mm), the duration of the period was maximum (14 days).

The summer period of butterflies is very long in time and the stage of egg laying overlaps the stage of hatching of caterpillars. Maize plants can have caterpillars of different ages at the same time. Therefore, for effective pest control with the help of insecticides, it is important to determine the date of the appearance of the first caterpillars, when they are not yet resistant to poisons and have not had time to penetrate into the plant. Being late with spraying for 2-3 days reduces the effectiveness of chemical preparations. To get the maximum result, it is necessary to carry out two treatments of corn with insecticides, repeated – no later than 10 days later.

To increase the effectiveness of corn protection from phytophage, processing was carried out according to Table 1.

Table 1 – Biological efficacy of drugs and entomophages against cotton scoops (Helicoverpa armigera Hb.) on corn crops, 2022

Experience options	Repetition	Number of copies/m^2					Decrease in the number,% on the day of accounting			
		Before handling	on the day of accounting							
			1	3	7	14	1	3	7	14
Ak kobelek, 3 l/ha + Extrasol, 2.0 l/ha + trichogram of 1 gr. / ha + golden-eyed 750 individuals / ha on the 3rd day after application of the drug	1	9,6±0,4	1,2±0,5	1,6±0,6	1,0±0,2	2,2±0,4				
	2	7,5±0,9	2,0±0,5	1,4±0,5	0,4±0,3	1,6±0,2				
	average	8,5±6,5	1,6±0,5	1,5±0,5	0,7±0,2	1,9±0,3	81,8	81,9	91,5	77,6
Bitoxibacillin, 3.0 l/ t + Bisolbisan, 2.0 l / ha + trichogram of 1 gr./ ha on the 3rd day after application of the drug + briacon 500 individuals / ha on the 7th day	1	9,4±0,4	1,0±0,2	1,2±0,2	0	1,6±0,3				
	2	7,3±0,3	2,0±0,4	1,4±0,3	1,0±0,6	1,7±0,4				
	average	8,3±0,3	1,5±0,3	1,3±0,2	0,5±0,3	1,9±0,3	82,6	84,3	93,9	78,9
Greengold, 0.3 l / t + Phytosporin-M, 2.0 l / ha + trichogram of 1 gr./ ha on the 3rd day after application of the drug + briacon 500 individuals / ha on the 7th day	1	9,3±0,4	1,2±0,4	1,1±0,2	0,2±0,2	1,5±0,3				
	2	8,5±0,2	1,1±0,5	1,1±0,4	0,7±0,3	1,7±0,4				
	average	8,95±0,3	1,2±0,4	1,1±0,3	0,4±0,2	1,6±0,3	86,3	86,7	95,1	82,1
Control (without handling)	1	8,2±0,5	8,3±0,6	8,2±0,5	8,4±0,4	9,3±0,5				
	2	9,2±0,3	8,4±0,4	8,4±0,4	8,3±0,4	9,0±0,6				
	average	8,7±0,4	8,8±0,5	8,3±0,4	8,3±0,4	9,1±0,5	-	-	-	-

These schemes against cotton scoops showed high biological efficiency on the seventh day was 91.5-95.1%, and on the 14th day, due to the release of bioagents, the efficiency was at the level of 77.6-82.1%. During the formation and maturation of soybeans, the Turkestan spider mite (Tetranychus turkestanicus Ug et. Nik). A significant increase in air temperature has a positive effect on the speed and intensity of mite reproduction, which leads to an increase in their number. In such conditions, the activity of the mobile stages of the tick increases sharply, and their harmfulness. Imago and tick larvae harm from June to September, during the branching - budding phase, they suck the juice from the lower leaf plate, entwining leaves, flowers, young beans with a web.

As a result, metabolism and photosynthesis are disrupted in the culture. Damaged parts of plants turn yellow, then turn brown and dry up, especially during high air temperatures. Severely damaged leaves fall off, the beans will ripen prematurely and crack, the grain will form puny. The tick is especially harmful in hot, arid weather at an air temperature of 29-35 ° C (July-August) and a low relative humidity of 35-55%. The spread of the pest in crops actively occurs during the bean formation phase. The EPV is two to three individuals of mobile tick stages on trigeminal leaves before flowering or ten individuals on trigeminal leaves during the formation and filling of beans.

During the flowering period – the ripening of beans on soybean crops, the Turkestan spider mite (*Tetranychus turkestanicus*) 10-12 copies / per leaf was detected, against which treatment was carried out according to Table 2.

Table 2 – Biological efficacy of preparations against the Turkestan spider mite (Tetranychus turkestanicus) on soybean crops, 2022

Experience options	Repetition	Number of copies/m^2					Decrease in the number,% on the day of accounting			
		Before handling	on the day of accounting							
			1	3	7	14	1	3	7	14
Actarophyte, 1 l/ha + Extrasol 2.0 l/ha + golden-eyed 750 individuals/ha	1	17,0±0,5	5,2±0,3	4,2±0,4	3,2±0,3	3,6±0,5				
	2	17,2±0,6	3,1±0,2	2,2±0,2	2,5±0,4	2,8±0,3				
	average	17,2±0,5	4,15±0,2	3,2±0,3	2,85±0,3	3,2±0,4	84,1	86,0	86,3	81,3
Bitoxybacillin, 3.0 L / T + Bisolbisan, 2.0 L / Ga + goldblock 750 persons / ha	1	16,9±0,4	6,2±0,7	4,0±0,5	2,0±0,2	2,5±0,3				
	2	16,7±0,3	2,6±0,2	3,6±0,3	3,6±0,4	3,8±0,5				
	average	16,8±0,3	4,4±0,45	3,8±0,4	2,8±0,3	3,1±0,4	83,2	83,4	86,6	81,5
Greengold, 0.3 l/t + Phytosporin-M, 2.0 l/ha + golden-eyed 750 individuals/ha	1	16,1±0,4	4,2±0,4	2,8±0,5	3,1±0,2	3,2±0,4				
	2	16,9±0,4	2,5±0,2	3,0±0,2	2,2±0,4	3,0±0,4				
	average	16,5±0,4	3,35±0,3	2,9±0,35	2,65±0,3	3,1±0,4	87,2	87,3	87,3	81,2
Control (without handling)	1	15,9±0,8	28,1±1,0	20,2±0,7	22,1±0,6	29,0±0,8				
	2	15,3±0,6	24,3±0,6	25,7±0,6	19,8±0,4	29,0±0,5				
	average	15,6±0,7	26,2±0,8	22,9±0,65	20,9±0,5	29,0±0,65	-	-	-	-

These schemes against spider mites have shown high biological efficacy. On the 7th day of accounting, the biological efficiency was 86.3–87.3%, due to the release of the entomophage goldeneye, the efficiency was at the level of 81.2–81.5%.

Conclusions

Thus, according to the results of the test, the pesticide load on the cultivated area and the environment is reduced in an ecological aspect, compaction and soil contamination occur to a lesser extent, due to a reduction in the number of passes of equipment through the field.

Gratitude

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АЛМАТЫ ОБЛЫСЫ ЖАҒДАЙЫНДА АУЫЛ ШАРУАШЫЛЫҒЫ ДАҚЫЛДАРЫНЫҢ (БИДАЙ, МАЙБҰРШАҚ, ЖҮГЕРІ) ЗИЯНКЕСТЕРІ ЖӘНЕ БИОЛОГИЯЛЫҚ ҚОРҒАУ ШАРАЛАРЫ

Андатпа

Мемлекет басшысының Жолдауларында белгіленген саланы дамытудың бірқатар бағдарламаларында (2017,2018, 2017-2021) біздің еліміздегі ауыл шаруашылығы өнімін өндірудің маңызды проблемаларының бірі дамудың экожүйелік жолын енгізу есебінен оның тиімділігін арттыруға негізделген жаңа пародигмаға көшу болып табылатыны көрсетілген. Бұл ауысу органикалық егіншілікті өндіруден және жануарлар мен халыққа зиянсыз экологиялық таза өнім алудан тұрады. Сондықтан, осы бапта баяндалған агротехнологияларды әзірлеу және өндіріске зиянды организмдерден қорғау шараларының экологияландырылған кешенін енгізу жөніндегі ғылыми зерттеулердің нәтижелері экологиялық таза (органикалық) өнім өндіруді шешудегі маңызды үлес болып табылады.

Бұл мақалада ауыл шаруашылығы дақылдарының зиянкестеріне карсы колданылган биологиялық қорғау шараларынын нәтижелері келтірілген. Экологиялық тұрғыдан алғанда, өңделетін аумаққа және қоршаған ортаға пестицидтік жүктеме азаяды, техниканың егістікке шығу санынын төмендеуі нәтижесінде топырақтың тығыздалуы мен ластануы аз дәрежеде орын алады. Мониторинг барысында ауыл шаруашылығы дақылдарының (бидай, майбұршак, жүгері) зиянкестері кездесіп, оларға Алматы облысы жағдайында биологиялық қорғау шаралары қолданылды.

Вегетациялық кезеңде топырақ қазба жұмыстары және зиянкес санының есебін жүргізу кезінде майбұршақта 11, жүгеріде 8, бидай мен арпада 15, рапс пен зығырда зиянкестердің 8 түрі анықталды.

Мақта көбелегіне (*Helicoverpa armigera* HB.) қарсы қолданған препараттар мен энтомофагтардың биологиялық тиімділігі жүгері дақылдарында жоғары биологиялық тиімділік көрсетті. Жетінші күні 91,5-95,1%, ал 14-ші тәулікте биоагенттер шығару есебінен тиімділік 77,6-82,1% деңгейінде болды. Өрмекші кенеге қарсы есептің 7–ші күні биологиялық тиімділік 86,3-87,3% құрады, алтынкөз энтомофагты шығару арқылы тиімділік 81,2-81,5% деңгейінде болды.

Кілт сөздер: Бидай, майбұршак, жүгері, зиянкестер, биологиялық қорғау, пестицид, органика.

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ВРЕДОНОСНЫЕ ВРЕДИТЕЛИ И БИОЛОГИЧЕСКАЯ ЗАЩИТА СЕЛЬСКОХОЗЯЙСТВЕННЫХ КУЛЬТУР (ПЩЕНИЦА, СОЯ, КУКУРУЗА) В УСЛОВИЯХ АЛМАТИНСКОЙ ОБЛАСТИ

Аннотация

В ряде Программ развития отрасли, обозначенных в Посланиях Главы Государства (2017,2018, 2017-2021), указывается, что одной из важнейших проблем производства сельскохозяйственной продукции в нашей стране является переход к новой пародигме, основанной на повышении его эффективности за счет внедрения экосистемного пути развития. Этот переход заключается в производстве органического земледелья и получения безвредной для животных и населения экологически чистой продукции. Поэтому, изложенные в настоящей статье результаты научных исследований по разработке агротехнологий и внедрения в производство экологизированного комплекса защитных мер от вредных организмов, является важным заделом в решении производства экологически чистой (органической) продукции.

В данной статье приведены результаты по применению биологической защиты против вредителей сельскохозяйственных культур. В экологическом аспекте уменьшается пестицидная нагрузка на обрабатываемую площадь и окружающую среду, в меньшей степени происходит уплотнение и загрязнение почвы, за счет сокращения числа проходов техники по полю. Во время мониторинга встречались вредоносные вредители сельскохозяйственных культур (пщеница, соя, кукуруза) и к ним была применена биологическая защита в условиях Алматинской области.

В вегетационый период при проведении почвенных раскопок и учетов численности на люцерне, эспарцете и сое обнаружены 11, на кукурузе отмечены 7, на пшенице и ячмене – 15, на рапсе и льне – 8 видов вредителей. Биологическая эффективность препаратов и энтомофагов против хлопковой совки (*Helicoverpa armigera* Hb.) на посевах кукурузыпоказали высокую биологическую эффективность на седьмой день составила 91,5-95,1%, а на 14-ые сутки за счет выпуска биоагентов эффективность была на уровне 77,6-82,1%.Против паутинного клеща на 7–ой день учета биологическая эффективность составила – 86,3-87,3%, за счет выпуска энтомофага златоглазка эффективность была на уровне 81,2-81,5%.

Ключевые слова: Пшеница, соя, кукуруза, вредители, биологическая защита, пестицид, органика.

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ВАРИАБЕЛЬНОСТЬ ХОЗЯЙСТВЕННО-ЦЕННЫХ ПРИЗНАКОВ КОЛЛЕКЦИОННЫХ ОБРАЗЦОВ ПРОСА НА СЕВЕРЕ КАЗАХСТАНА

Аннотация

Изучена генетическая коллекция образцов проса обыкновенного различных эколого-географических групп. Проведен структурный анализ коллекционных образцов по основным хозяйственно- ценным признакам и проанализированны параметры качества. По итогам изучения в меняющихся погодно-климатических условиях выявлены формы проса, представляющие интерес в качестве источников высокой продуктивности, скороспелости, качества зерна и устойчивости к болезням. Оценена внутрисортовая изменчивость различных генотипов проса по высоте растений, размеру и продуктивности метелки, окраске, качеству