N E W S
OF THE NATIONAL ACADEMY OF SCIENCES OF THE REPUBLIC OF KAZAKHSTAN
SERIES OF BIOLOGICAL AND MEDICAL
ISSN 2224-5308
Volume 6, Number 336 (2019), 35 – 39 **https://doi.org/10.32014/2019.2519-1629.54**

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MONITORING SOY DISEASES ON IRRIGATED LANDS OF KAZAKHSTAN

Abstract. The flock contains data on the monitoring of soybean crops carried out by the Almaty and Zhambyl regions on the spread and development of diseases.It was found that fusarium, peronosporosis, white and gray rot are widespread soy disease, as well as ascochitosis, septariosis, anthrocnosis and a burn of stems. It has been shown that fusariosis occurs in all soybean crops in the Almaty region. The causative agents are fungi of the genus Fusarium spp. From leaf forms of diseases peronosporosis is widespread. On the Eureka-357 variety, the development of the disease was 25.7%, and the prevalence of the disease reached 100%. Infection of soybean seeds with diseases was determined. On soybean seeds, the most common pathogen is a Fusarium infection. It is found in all analyzed seeds of the varieties of this culture. The results of the evaluation of soybean seed dressers are presented.

Among the treated dressers, the most effective were foundazole and Maxim, where, when using these dressers, the norm was 2-3 l / t, the intensity of the development of the disease during the harvest period decreased by 7.95 and 8.2%, respectively.

Key words: soy, disinfectant, distribution, degree of disease development, germination, fusarium, white and gray rot, peronosporosis, efficiency, seeds, yield.

In recent years, in the Republic of Kazakhstan, much attention has been paid to increasing soybean production, it is being taken to increase the yield of this valuable crop, expand sown areas, and reduce crop loss from diseases. It is well known that among legumes soybean has a high content of essential nutrients. Its seeds contain up to 50% of high quality raw protein. In addition, its protein has a higher digestibility coefficient, and it is richer in valuable essential amino acids (lysine, methionine, tryptophan, etc.). By biological value, soy is compared with the protein of meat, milk, eggs, the fat content of 25% and no worse than butter from cow's milk. Soy also contains minerals vitamins [1]. All this allows you to use it for food, technical and feed purposes [2].

Soybean is also of great importance in increasing soil fertility. Due to nodule bacteria, the arable layer is enriched with organic nitrogen. In addition, it is a good precursor for many [3,4] crops.

Being a culture of multifaceted use, soy is unparalleled in its universality of application. Already now it is used for the manufacture of more than 400 types of industrial products.

As you can see, the economic value of soybeans is multifaceted, therefore, a comprehensive increase in the size of sown areas in southeast Kazakhstan and its advancement to the east (East Kazakhstan region), west (Aktyubinsk, West Kazakhstan region) and north (Kostanay region) countries is an important step in the intensification of agricultural production. The introduction of this crop in the irrigated lands of the south, southeast, east, west and north of the republic that meets the biological and biological requirements of soy according to the soil and climatic conditions will make it possible to increase the productivity of each irrigated hectare, the payback of costs and the productivity of animal husbandry.

Currently, sown area under soybean reaches 150 thousand ha, which is not enough for Kazakhstan. The reserves for obtaining raw materials for the production of soy protein in the republic are essentially unlimited. Kazakhstan has every opportunity to bring clean soybean crops to 1.0 million ha.

In the republic, in leading equitable farms, subject to all the rules of agricultural technology, they get a high yield. So, in 2000 in the PC named after D.A. Kunaev, Talgar district, Almaty region, the soybean grain yield was 46.5c / ha, in the same year, the Aktyubinsk regional station received a crop of 27.09 / ha, and in 2015 on an experimental base of the Kazakh Research Institute of Agriculture and Plant Growing, the yield per hectare reached 67 , 5ts / ha. At the same time, in recent years, there has been a tendency to an increase in yield losses of this valuable crop due to the spread of various harmful organisms in its crops, which include infectious diseases that affect soybeans during different periods of vegetation.

Currently, according to scientists around the world, more than three hundred diseases have been discovered on soy. For example, in the USA, 25 pathogens are a constant threat to this culture, of which 19 are fungal, 3 are bacterial and 3 are viral. In China, out of the 8 most common diseases, fungal infections are 6. In Russia, only 32 soy pathogens are known, in Ukraine - 23. In the Russian Federation, among the 6-7 main soy pathogens, as a rule, 1-2 bacterial [5] are constantly called.

Soy diseases annually cause enormous damage to the crop of this valuable crop. So, in years with normal weather conditions in the Far East [6,7], due to damage to plants by various diseases, seed yields decrease by 20-30%, and in years with heavy rainfall by 50% or more.

We are in 2013-2017. Together with the staff of the leguminous crops department of the Kazakh Research Institute of Agriculture and Plant Growing, the phytosanitary condition of soybean crops was studied. The spread of diseases and the species composition of pathogens was studied by route surveys of soybean crops in Almaty and Zhambyl regions, and seed contamination was determined according to generally accepted methods [8, 9].

More than 20 diseases were registered on soybean plants in the republic: 15 fungal, 3 viral and 3 bacterial diseases. Among soy diseases in the republic, the most common and harmful are fusarium, peronosporosis, white and gray rot, and also in some regions of the country - phomopsis.

Fusarium is especially widespread in recent years. The causative agents are fungi of the genus Fusarium spp. The fungus infects seedlings and causes plants to wilt. So, the death of shoots from Fusarium infections in a cold and protracted spring can reach 30-50%. They were most affected by soybean in those farms where crops were thickened, clogged and crop rotation was not observed. So, in certain fields of the farm “Amangeldi” of the Koksu region, the damage to plants by the disease reached 50% [11]. In other farms on soybean crops, foci were found where 15-25% of plants were affected. In this regard, some fields had to be reseeded.

In wet years, white and gray rot spread strongly on soybeans (they were observed everywhere in 2013,2016 and 2017. Of the diseases affecting mainly plant leaves, downy mildew is widespread. The degree of damage in wet years reaches up to 100%, which leads to a decrease in the assimilation surface of the leaves, as a result of this pathogen can reduce the yield of this culture to 60-70%.

Surveys have shown that in a number of farms the development of epiphytoties of white, gray rot and peronosporosis or downy mildew was promoted not only by weather conditions, but also by violations of the technology of cultivation of the crop. Some farms do not comply with crop rotation and return soybeans to their former place in two to three years or even earlier. There is a farm culture cultivated in monoculture. This leads to massive accumulation of fungal infection in the soil.

Farm “Turgen” of Enbekshikazakhsky district soybean crops were heavily clogged with sow thistle and annual weeds, where 70% of the field was affected by plants affected by white and gray rot. Ayyr-Shir LLP of Talgar region, where soya is paid enough attention, is grown on a high agricultural background, there were no diseases on the crop during the growing season or they appeared to a weak degree before harvesting.

Zoned varieties of local and foreign selection, as well as varieties and varietal samples that are in a competitive test, are not resistant to diseases affecting soybeans (table 1).

Seeds serve as a source of infection of plants with dangerous infectious diseases. They can preserve the causative agents of many infectious diseases, be a source of renewal for the next year; with seeds, pathogens can be transferred to new areas where they did not exist before, i.e. are important in the migration of pathogenic microorganisms and the spread of infectious diseases of soy. Seed infection in soybeans is very harmful, its development on seedlings leads to the death of plants. Plants affected by Fusarium root rot lag behind in growth, do not form at all or form small beans that produce unobtrusive seeds. As a result of monitoring soybean crops, we selected 17 batches of soybean seeds for phyto-examination in 8 farms of the Almaty region. Its results are presented in table 2.

Table 1 – Infection of commercial soybean varieties with diseases during the growing season of Kazakh scientific research institute of protection and crop production 2013-2018

Class	Originofclass	Amazed, %		Growth, %
		fusarium	sclerotiniosis	peronaporosis
Kazakhstan 200	Kazakhstan	6,5	5,5	13,3
Almaty	Kazakhstan	3,5	0,0	9,5
Savage	France	1,0	0,0	3,0
Sting	Kazakhstan	12,5	4,5	13,5
Tazhin	Netherlands	2,5	0,0	21,1
Eureka-357	Moldova	7,5	4,0	25,7
Zen	China	9,5	0,0	17,0
SibNISH-1	Russia	27,0	10,0	13,5
Swallow	Kazakhstan	7,5	1,5	8,0
Zhansaya	Kazakhstan	11,5	6,5	23,0
Vita	Kazakhstan	8,5	7,0	17,8

Table 2 – Infection of soybean seeds with diseases in the conditions of Almaty region

Disease	Weighted average percentage of infection, %		
	2015	2016	2017
Fusarium	0,5	1,0	7,5
Peronosporosis	0,7	1,2	13,0
Septariosis	2,0	0,2	3,5
Burnstems	–	0,1	0,5
Ascochitosis	1,5	1,1	6,0
Alternariosis	0,1	0,5	5,5

We must not underestimate the danger of penetration into the republic of pathogens that are absent in our country with imported foreign seeds. A similar thing already happened when phomopsis entered Kazakhstan from abroad with infected seed material.

In addition, a number of diseases are described in different countries of the world that we have not yet discovered, however, judging by the biology of the causative agents of the diseases and given the similar climatic conditions, there is reason to believe that these diseases may eventually appear on our soy plantations.

By us during 2017-2018. At the experimental base of the Kazakh Scientific Research Institute of Agriculture and Plant Growing, as well as the laboratory of the Kazakh National Women's Pedagogical University, the influence of protectants on seed germination and disease emergence was studied.

To improve seed health from fusarium, scleretiniosis, ascochitosis, peronosporosis and other diseases, we studied the following drugs: foundationazole (3l / t), rovral (3kg / t), apron (6kg / t), derazole (3kg / t), tachigaren (6kg / t), maxim (2l / t), scarlet (2l / t), vitalon (3l / t). Control seeds were not etched. TMTD-4kg / t was used as a reference. Etching was carried out one to two days before sowing. Variety Zhalpak-Saz. The area of each plot was 25 sq.m., the repetition of 4-fold. When studying the effect of dressing agents on seed germination, the latter were sown in laboratory and field conditions, all preparations had a positive effect on seed germination (table 3), the highest results were noted in variants with foundationazole, tachigaren, maxim, scarlet and vitalon. Their laboratory germination rate was 85.9, respectively; 85.5; 85.0; 84.5; 83.0% and exceeded control by 8, respectively; 7.5; 7; 5.5 and 5%, the variant with ethanol is 4; 3.5; 3.0; 1.5 and 1.0%. The preparations acted favorably on the increase in field germination of seeds in comparison with the control by 1.3–13.8%.

Table 3 – Efficiency of soybean seed dressers (grade Zhalpak-Saz, 2017-2018)

Variant	Consumption rate, kg, l / t	Laboratory germination, %	Field germination, %	The defeat of Fusarium rot,%				Harvest, t / ha
				seedlingphase		beforecleaning		
				affected plants	disease-progression	affected plants	disease-progression	
Controlwithoutreatment	–	78,0	59,2	32,0	11,4	58,5	19,2	30,5
TMTD (standard)	4,0	82,0	63,7	22,1	5,04	42,0	15,2	33,2
Tachigaren	6,0	83,5	72,0	6,4	0,6	25,0	2,5	35,5
Apron	6,0	79,5	61,5	23,4	7,6	56,5	17,5	32,8
Fundazole	3,0	83,0	66,0	8,1	0,3	38,5	11,25	33,7
Scarlet	2,0	83,0	66,7	16,4	1,4	52,5	17,3	33,0
Derazole	3,0	82,0	63,7	20,3	5,3	40,0	17,8	33,0
Rovral	3,02,0	85,0	66,5	9,6	1,0	35,0	11,0	34,3
Maksim	2,0	82,5	65,5	9,1	0,5	35,5	11,0	34,0
Vitalon	2,0	84,5	67,0	10,0	0,7	39,0	12,0	33,9

On average, over two years in the variants with the use of foundationazole (3 l / t), maxim (2 l / t) and vitalon (3 l / t), the development of fusarium rot was 0.3; 0.5 and 0.7%, which is less than the control by 11.1; 10.9 and 10.7% and was lower than in versions with a standard (TMTD, 4kg / t) by 5.4; 4.9 and 4.7%. Positive results were obtained when treating soybean seeds with a scarlet (2 l / t) and tachigaren (6 kg / t). A similar pattern was observed during the harvest period. So, during the pre-sowing treatment of soybean seeds with rovral in the norm of 3 kg per 1 ton of seeds, the degree of damage to plants with fusarium rot decreased by 8.12%. In the fight against fusarium rot, a high effect was exerted by derosal and foundationazole at a rate of 3 l / t, the intensity of the development of the disease during the harvest period decreased by 2.4 and 7.97%, respectively.

The use of dressing agents has increased soybean productivity. So, the yield in variants with the use of foundationazole and Maxim, respectively, amounted to 33.7; and 34.0 t / ha, which is 3.2 and 0.8 t / ha more than in the control (30.5 t / ha) and 0.7 and 0.8 t / ha higher compared to seed treatment TMTD (4 kg / t).

Thus, among the studied protectants, the most effective were foundazole and Maxim. The use of these drugs helps to increase field germination by 6.3 and 6.8%, reduce the prevalence and development of fusarium rot in the seedling phase by 22.9-23.9% and 2.4-17.7%.

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ҚАЗАҚСТАННЫҢ СУАРМАЛЫ ЕГІС АЛҚАПТАРЫНДАҒЫ ҚЫТАЙ БҰРШАҒЫНЫҢ АУРАЛАРЫНА МОНИТОРИНГ

Аннатация. Қазақстанның қытай бұршағы егілетін суармалы егіс алқаптарына жүргізілген мониторинг нәтижесінде осы дақылдың ауруларының таралуы мен дамуы анықталды. Кең тараған аурулардың түрлеріне мыналар жатада, фузариоз, ақ және сұр шіріктері және жапырақтарында көптеген дақ аурулары кездеседі. Алматы облысының егіс алқаптарында өте қауіпті және зиянды фузариоз ауруы кең тараған, ал жапырақтарында пероноспороз патогені кең көлемде кездеседі. Эврика-357 сортында аталған аурудың даму деңгейі 25,7% жеткен. Сонымен бірге қытай бұршағының тұқыммымен таралатын ауру қоздырғыштары анықталды. Қытай бұршағы тұқымымен берілетін ауру қоздырғыштарын препараттармен дәрілеудің тиімділігі келтірілген. Максим және фундазол препараттарының тұқым ауруына тиімділігі жоғары екені көрсетілген.

Түйін сөздер: Қытай бұршағы, патоген, таралуы, дамуы, аурулар, өнгіштігі, фузариоз, ақ және сұр шіріктері, пероноспороз, тиімділік, тұқым, өнім.

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МОНИТОРИНГ БОЛЕЗНЕЙ СОИ НА ОРОШАЕМЫХ ЗЕМЛЯХ КАЗАХСТАНА

Аннотация. В стаье приводятся данные по мониторингу посевов сои, проведенного Алматинской и Жамбылской областях по распроастранению и развитию болезней, Установлено, что широко распространенной болезнью сои являются фузариоз, пероноспороз, белая и серая гнили, а также встречаются аскохитоз, септариоз, антрокноз и ожог стеблей. Показано,что на всех посевах сои в Алматинской области встречается фузариоз. Возбудители грибы родаFusariumspp. Из листовых форм болезней широко распространен пероноспороз. На сорте Эврика-357 развитие болезни составило 25,7%, а распространенность болезни достигало 100%. Определена зараженность семян сои болезнями. На семнах сои наиболее распрстраненным возбудителем являюется фузариозная инфекция. Она встречается во всех анализированных семенах сортов этой культуры. Представлены результаты оценки протравителей семян сои.

Среди изученных протравителей наиболее эффективными оказались фундазол и Максим, где при применении указанных протравителей в норме 2-3л/т, интенсивность развития болезни в период уборки уменьшилась соответственно на 7,95 и 8,2%.

Ключевые слова: соя, протравитель, распространение, степень развития болезни, всхожесть, фузариоз, белая и серая гнили, пероноспороз, эффективность, семена, урожай.

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