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RESULTS OF THE PRELIMINARY ENVIRONMENTAL TESTING OF VARIETY OF SOUTH SOFT WHEAT CHINESE CHOICE IN THE CONDITIONS OF NORTH AND CENTRAL KAZAKHSTAN

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Annotation

The publications present the results of an environmental study of soft wheat varieties in the North Kazakhstan, Akmola and Karaganda regions. As a standard in North Kazakhstan (Akmola and North Kazakhstan region). A variety of spring soft wheat Astana was used, in Central Kazakhstan (Karaganda region). A variety of spring soft wheat Karaganda 22. The results of a preliminary study of spring wheat varieties showed that some of them they are missing. climatic conditions of Northern and Central Kazakhstan form the overall productivity, the area of 1000 grains, the area of grain per ear. The productivity of the studied varieties of spring soft wheat in the conditions of North Kazakhstan region ranged from 26.3 c / ha (Xn 09) to 14, 3 c / ha (Xn 01), in the Akmola region it ranged from 24.0 c / ha (Xn 11) up to 8.8 centners per hectare (Xn 01), in Karagandinskaya from 29.7 centners per hectare (Xn 04) to 23.5 centners per hectare (Xn 03). The results obtained are the result of completely different environmental phenomena.

Key words: ecological study, soil and climatic conditions, variety, wheat, grain yield, genotype, ecological plasticity and stability.

Introduction.

At the present, along with the transfer and adaptation of modern agricultural technologies to agricultural production, the research programs of

the Ministry of Agriculture of the Republic of Kazakhstan place great emphasis on transferring the best foreign varieties and hybrids in order to

identify their adaptation to specific soil and climatic conditions. This is due to the fact that in foreign selection of agricultural crops number that are economically important there are significant achievements. New breeding varieties with high productivity, resistance to disease, good quality products were created. Environmental testing of these varieties in specific conditions allows to give an objective assessment of a particular variety by productivity, length of the growing season, resistance to diseases, pests and other economically useful traits [1]. In addition, environmental testing allows to assess the level of regional breeding development in relation to agricultural crops, to determine the competitiveness and flexibility of foreign breeding in comparison with varieties of own selection. It should be noted that if the results of environmental studies show a clear superiority of varieties of foreign breeding over domestic varieties, this indicates a lack of development of breeding in the country where these varieties were tested as part of environmental studies.

In the agricultural sector of northern and central Kazakhstan, high-yield varieties of spring soft wheat are currently in demand. In this regard, to meet the need for high-quality varieties capable of producing high yields in the climatic conditions of northern and central Kazakhstan, it is advisable to carry out environmental testing of promising varieties and lines of spring wheat, both domestic and foreign selection. In order to make an objective assessment of wheat productivity is not enough data on yield in soil and climatic conditions. The significance of

environmental testing is precisely that the studied varieties are studied for suitability of cultivation in various geographical points [2]. It is known that the indicator of the level of spring wheat yield varieties is influenced by various factors: meteorological conditions (air temperature, precipitation, etc.); variety genotype; soil conditions; epiphytotics of various diseases; mineral nutrition level; agrotechnical background, etc. In this regard, to determine the relative share of influence of factors on the productivity of a variety of spring soft wheat in a specific region, it is necessary to analyze various indicators that make up its yield. The most significant is the identification of varieties that are characterized by stable yield and suitability for cultivation in various soil and climatic conditions. [3]. For this, conduct research and evaluation of the productivity of spring soft wheat varieties in ecological zones that differ in soil, climatic and agrotechnological conditions of cultivation. In favorable conditions, preference should be given to varieties with high potential productivity, whereas in adverse and extreme conditions the latter should be combined with a relatively high environmental sustainability.[4]. The reaction of the studied varieties of spring wheat to various environmental conditions makes it possible to judge the fitness and stability of the plant genotype and is defined as environmental plasticity. The main parameter of its determination is the grain yield as the final indicator of the integrated productivity of the plant. The great importance of environmental plasticity is noted in their research by

many leading breeders. N.I.Vavilov highlighted that the variety should be plastic, if possible, especially in a non-continental climate. For agricultural production, the most valuable will be

Material, research methodology and weather conditions.

In the climatic conditions of 2018 in the northern and central Kazakhstan in the framework of environmental testing 10 varieties of spring wheat of Chinese breeding were studied. These varieties were tested in three geographic locations.: North-Kazakhstan region (Field station JSC«S.Seifullin KATU», LLP «North-Kazakhstan AES»); Akmola region (Field station JSC«S.Seifullin KATU», CF «Niva»); Karagandy region (Field station JSC«S.Seifullin KATU», JSC «A.F.Khristenko Karagandy AES»). Predecessor - pairs. In the experiment, spring soft wheat varieties were sown according to conventional agrotechnology at optimal sowing dates (May 15-25). Sowing was carried out by the SSFC-0.7 seeder. The seeding rate of 3.0 million viable seeds per 1 ha. Accounting area plots - 5 m². Repetition in the experience of 4-fold.

During the growing season, records and phenological observations were made. The density of standing plants after germination and before harvesting was determined, the date of onset and duration of ontogenesis phases — sprouting, tillering, flowering, earing, ripening were noted. Samples were evaluated for resistance to drought, lodging, susceptibility to diseases and pests. Harvest was taken into account in the phase of full ripeness of grain. Plants from accounting platforms were subjected to structural analysis, the physical qualities of the grain were

plastic varieties, which have a higher average level of yield and a smaller range of fluctuations of signs in changing growing conditions [4,5].

evaluated - grain size (1000 seeds weight), completeness, nature and vitreousness of the grain. Ecological study of varieties of spring wheat was conducted according to the method of state testing of agricultural crops. [6,7]. Mathematical processing of crop data was carried out according to Dospekhov [8].

Weather conditions during the research period were relatively favorable for the growth and development of plants of grain crops. The amount of precipitation for the period January - March months in the North Kazakhstan region (LLP North Kazakhstan AES) was 44.3 mm, which was within the average multiyear average (44.0 mm). The amount of precipitation in April-May was 87.2 mm, which is 36.2 mm above the multiyear average. In July, 56.2 mm of precipitation fell, which is 12.2 mm higher than the average multiyear average. In total, in August 147.8 mm of precipitation was observed, which was 314% higher than the average multiyear average. The amount of precipitation in the Akmola region (CF «Niva») for June-August was 202.2 mm, which is 67.5 mm above the multiyear average. The amount of atmospheric precipitation in the Karaganda region (A.F. Khristenko Karaganda AES) for the growing season of plants (May-August) was 237.2 mm, which is 96.0 mm higher than the multiyear average.

Thus, the weather conditions for precipitation when conducting research on the environmental testing of spring wheat varieties under conditions of northern and central Kazakhstan can be characterized as relatively favorable for the cultivation of spring wheat varieties. In general, in three geographical points, intensive

Research results.

The main purpose of these studies was to study the adaptive ability of varieties of foreign breeding in the soil and climatic conditions of northern and central Kazakhstan, to give them a comprehensive assessment of yield, ecological stability and plasticity parameters, while ensuring the transfer of the best of them to

Table 1 – The results of environmental testing of spring wheat varieties in the North Kazakhstan region (Field Station JSC «S.Seifullin KATU», LLP «North Kazakhstan AES», 2018)

| № | Title varieties, branch | Plant height cm | Number of grains in the spire, p. | Grain weight from the spire, g | Mass 1000 seeds, g | Yield, c/ha | ± from standard |
|----------|-------------------------|-----------------|-----------------------------------|--------------------------------|--------------------|-------------|-----------------|
| St. | Astana | 130 | 39,0 | 2,0 | 32,0 | 21,3 | - |
| 1 | Xn 09 | 98 | 40,0 | 1,8 | 41,0 | 26,3 | + 5,0 |
| 2 | Xn 11 | 73 | 42,0 | 2,0 | 45,4 | 25,7 | + 4,4 |
| 3 | Xn 12 | 65 | 41,5 | 2,2 | 46,5 | 24,4 | + 3,1 |
| 4 | Xn 13 | 65 | 48,9 | 1,9 | 44,0 | 23,9 | + 2,6 |
| 5 | Xn 10 | 100 | 34,0 | 1,0 | 36,0 | 23,9 | + 2,6 |
| 6 | Xn 02 | 77 | 34,0 | 1,4 | 39,0 | 21,4 | + 0,1 |
| 7 | Xn 06 | 71 | 36,0 | 1,5 | 38,0 | 20,3 | - 1,0 |
| 8 | Xn 03 | 58 | 21,0 | 1,0 | 43,0 | 17,0 | - 4,3 |
| 9 | Xn 08 | 100 | 39,0 | 1,8 | 40,0 | 15,2 | - 6,1 |
| 10 | Xn 04 | 54 | 25,0 | 0,9 | 39,0 | 14,9 | - 6,4 |
| LSD 0.05 | | | | | 2,3 | | |

According to the results presented in Table 1, the productivity of the studied varieties of spring wheat ranged from 26.3 centners / ha (Xn 09)

precipitation fell on the critical phases of wheat plant development, but the temperature and heat gain during the growing season were marked by a noticeable lag, which delayed the development and maturation of plants, which somewhat complicated the harvesting process.

agricultural production. The results of the ecological study of varieties of spring wheat in the climatic conditions of the North Kazakhstan region (S.Seifullin Field Station of KATU, JSC North Kazakhstan AES) are presented in Table 1.

to 14.3 centners / ha (Xn 01). At the same time, the wheat varieties showed the highest productivity in the experiment: Xn 09 - productivity 26.3

centners / ha, deviation from the standard + 5.0 centners / ha; Xn 11 - productivity 25.7 centners per hectare, deviation from the standard + 4.4 centners per hectare; Xn 12 - productivity +24,4 c / ha, deviation from the standard + 3.1 c / ha; Xn 13, Xn 10 - productivity 23.9 centners per hectare, deviation from the standard + 2.6 centners per hectare.

The mass of 1000 seeds in the studied varieties ranged from 46.5 g (Xn 12) to 36.0 g (Xn 10). In the experiment, all varieties, by exception, by mass of 1000 seeds exceeded the standard variety of spring wheat - Astana (32.0 g).

Вес зерна с колоса у отдельных сортов пшеницы находился на уровне стандартного сорта Астана (2,0 г) и составлял у Xn 12 - 2,2 г, Xn 11 - 2,0 г. У сортов пшеницы - Xn 13, Xn 09, Xn 08 данный показатель находился в пределах 1,8 г.- 1,9 г. У сорта

пшеницы Xn 06 вес зерна с колоса составлял 1,5 г. У остальных, изучаемых сортов вес зерна с колоса не превышал 1,5 г.

By the number of grains per ear, the standard grade Astana (39.0 pcs.) - Xn 09 (40.0 pcs.), Xn 12 (41.5 pcs.), Xn 11 (42.0), Xn 13 (48, 9).

Plant height in the studied wheat varieties ranged from 100 cm (Xn 10, Xn 08) to 54 cm (Xn 04). In the standard variety of spring wheat Astana, this indicator was at the level of 100 cm. In general, the studied varieties were lower in plant height than the standard variety of wheat Astana from 76 cm (Xn 04) to 30 cm (Xn 10, Xn 08).

The results of the ecological study of varieties of spring wheat in the climatic conditions of the Akmol region (Field Station of S.Seifullin KATU, CF "Niva") are presented in Table 2.

Table 2 - Results of environmental testing of spring wheat varieties in the Akmol region (Field Station JSC "S.Seifullin KATU", CF «Niva», 2018)

| № | Title varieties, branch | Plant height cm | Number of grains in the spire, p. | Grain weight from the spire, g | Mass 1000 seeds, g | Yield, c/ha | ± from standard |
|-----|-------------------------|-----------------|-----------------------------------|--------------------------------|--------------------|-------------|-----------------|
| St. | Astana | 78 | 24,0 | 1,0 | 42,0 | 14,9 | - |
| 1 | Xn 11 | 50 | 50,5 | 2,8 | 55,0 | 24,0 | + 9,7 |
| 2 | Xn 12 | 53 | 42,0 | 1,8 | 58,0 | 19,6 | + 4,7 |
| 3 | Xn 13 | 55 | 48,5 | 2,3 | 50,0 | 19,0 | + 4,1 |
| 4 | Xn 08 | 70 | 43,9 | 2,2 | 50,0 | 18,9 | + 4,6 |
| 5 | Xn 10 | 65 | 38,0 | 0,9 | 50,0 | 14,2 | - 0,7 |
| 6 | Xn 09 | 67 | 34,0 | 2,0 | 56,0 | 11,6 | - 3,3 |
| 7 | Xn 02 | 50 | 30,2 | 1,4 | 36,0 | 11,5 | - 3,4 |
| 8 | Xn 04 | 45 | 34,0 | 1,3 | 40,5 | 9,8 | - 5,1 |
| 9 | Xn 03 | 48 | 25,0 | 1,2 | 50,0 | 9,2 | - 5,7 |
| 10 | Xn 07 | 49 | 34,0 | 1,8 | 40,0 | 9,0 | - 5,9 |

According to the results presented in this table, the productivity of the studied varieties of spring wheat ranged from 24.0 c / ha (Xn 11) to 8.8 c / ha (Xn 01). At the same time, the wheat varieties showed the highest productivity in the experiment: Xn 11 - productivity 24.0 c / ha, deviation from the standard + 9.7 c / ha; Xn 12 - productivity 19.6 centners per hectare, deviation from the standard + 4.7 centners per hectare; Xn 13 - productivity +19.0 c / ha, deviation from the standard + 4.1 c / ha; Xn 08 - productivity 18.9 centners per hectare, deviation from the standard + 4.6 centners per hectare.

The mass of 1000 seeds in the studied varieties ranged from 58.0 g (Xn 12) to 36.0 g (Xn 02). In the experiment, wheat varieties - Xn 12 (58.0 g), Xn 09 (56.0 g), Xn 11 (55.0 g), Xn 13 (50.0 g), Xn 08 (50.0 g), Xn 03 (50.0) by the weight of 1000 seeds exceeded the standard variety of spring wheat - Astana (32.0 g).

The weight of grain per spike in the standard wheat variety Astana was

at the level (1.0 g). In wheat varieties - Xn 11, Xn 13, Xn 08, Xn 09, Xn 12 Xn 07, this indicator was within 2.8 g - 1.8 g, which is significantly higher than the standard variety.

By the number of grains per branch, all studied varieties exceeded the standard grade Astana (24.0 pcs.). The largest number of grains per ear in the experiment was noted in wheat varieties - Xn 11 (50.5 pcs.), Xn 13 (48.5 pcs.), Xn 08 (43.9), Xn 12 (42.0).

Plant height in the studied wheat varieties ranged from 70 cm. (Xn 10) to 45 cm. (Xn 04). In the standard variety of spring wheat Astana, this indicator was at the level of 78 cm. In general, in the experiment conducted, the standard variety Astana did not exceed any of the studied wheat varieties.

The results of the ecological study of varieties of spring wheat in the climatic conditions of the Karaganda region (Field Station of S. Seifullin KATU, LLP, A.F. Khristenko Karaganda AES) are presented in Table 3.

Table 3 - Results of environmental testing of spring wheat varieties in the Karaganda region (Field Station JSC «S.Seifullin KATU», LLP «A.F. Khristenko Karaganda AES», 2018)

| № | Title varieties, branch | Plant height cm | Number of grains in the spire, p. | Grain weight from the spire, g | Mass 1000 seeds, g | Yield, c/ha | ± from standard |
|-----|-------------------------|-----------------|-----------------------------------|--------------------------------|--------------------|-------------|-----------------|
| St. | Karaganda 22 | 77 | 28,5 | 1,5 | 44,0 | 24,5 | - |
| 1 | Xn 04 | 45 | 40,4 | 1,9 | 44,0 | 29,7 | + 5,2 |
| 2 | Xn 11 | 60 | 49,0 | 2,38 | 43,2 | 29,6 | + 5,1 |

| | | | | | | | |
|---------|-------|----|------|------|------|------|-------|
| 3 | Xn 13 | 58 | 40,0 | 2,0 | 48,8 | 29,1 | + 4,6 |
| 4 | Xn 02 | 58 | 51,5 | 2,1 | 41,6 | 28,8 | + 4,3 |
| 5 | Xn 06 | 55 | 42,3 | 1,8 | 43,2 | 28,1 | + 3,6 |
| 6 | Xn 12 | 55 | 44,5 | 2,28 | 50,4 | 26,1 | + 1,6 |
| 8 | Xn 10 | 86 | 43,8 | 1,8 | 41,6 | 24,9 | + 0,4 |
| 9 | Xn 09 | 72 | 37,2 | 1,8 | 40,0 | 23,1 | - 1,4 |
| 10 | Xn 08 | 81 | 44,2 | 1,9 | 43,2 | 24,1 | - 0,4 |
| 12 | Xn 03 | 49 | 42,5 | 1,5 | 44,6 | 23,5 | - 1,0 |
| LSD0.05 | | | | | 2,1 | | |

According to the results presented in this table, the productivity of the studied varieties of spring wheat ranged from 29.7 centners / ha (Xn 04) to 23.5 centners / ha (Xn 03). The productivity of the standard variety Karaganda 22 was at the level of 24.5 c / ha. Wheat varieties showed the highest productivity in the experiment: Xn 04 - productivity 29.7 centners per hectare, deviation from the standard + 5.2 centners per hectare; Xn 11 - productivity 29.6 centners per hectare, deviation from the standard + 5.1 centners per hectare; Xn 13 - productivity +29.1 c / ha, deviation from the standard + 4.6 c / ha, Xn 02 - productivity 28.8 c / ha, deviation from the standard + 4.3 c / ha, Xn 06 - productivity 28 , 1 centner / ha, deviation from the standard + 3.6 centner / ha.

The mass of 1000 seeds in the studied varieties ranged from 50.4 g (Xn 12) to 40.0 g (Xn 09). In the standard variety Karagandinskaya 22, this indicator was at the level of 44.0 g. In the experiment being conducted, wheat varieties of Xn 12 (50.4 g) and

Discussion of the results

N.I. Vavilov noted: "The dependence of a variety on the environment and the impossibility of separating it from external conditions

Xn 13 (48.8 g) had a high mass of 1000 seeds. In other studied varieties, the mass of 1000 seeds was at the standard or slightly lower than it.

The weight of grain per branch in the standard wheat variety Karaganda 22 was 1.5 g. The highest grain mass per branch varieties were Xn 11 (2.38 g), Xn 12 (2.28 g), Xn 13 (2.0 g), Xn 04 (1.9 g), Xn 08 (1.9 g), Xn 09 (1.8 g), Xn 10 (1.8 g).

In the experiment, all the studied wheat varieties by the number of grains per branch exceeded the standard variety Karaganda 22 (28.5 pcs.). The highest amount of grains in the branch possessed varieties - Xn 02 (51.5 pcs.), Xn 11 (49.1 pcs.), Xn 12 (44.5), Xn 08 (44.2), Xn 10 (43, 8), Xn 06 (42.3).

Plant height in the studied wheat varieties ranged from 86.0 cm (Xn 10) to 45 cm (Xn 04). In the standard variety Karaganda 22, the height of plants was within 77 cm. In general, the varieties studied were inferior in height to the standard variety Karaganda 22, with the exception of wheat varieties Xn 10 (86 cm) and Xn 08 (81 cm).

make it necessary to investigate a variety in conditions of a certain environment. The question of the environment and the interaction of the

organism and the environment is one of the most important sections of selection” [9]. According to V.A. Drahavtseva and N.V. Kocherina [10], of all genetic and ecological-genetic processes that increase the genotypic variability of quantitative traits, the strongest contribution to productivity can provide the effect of genotype-environment interaction. In this regard, in the conditions of increasing changes in weather factors, the ecological adaptability of varieties comes to the fore. The study of the existing set of varieties in specific soil and climatic conditions is important not only from the economic point of view for choosing the most fruitful, but also for breeding practice - for involvement in the process of breeding new varieties with genetically determined adaptability to cultivation conditions, tillage techniques.

An analysis of the preliminary results of this work allowed to study the ecological adaptability of spring soft wheat varieties, to identify their productivity in various geographical points of Northern and Central

Kazakhstan. Thus, the spring soft wheat variety Xn 11 showed high productivity in the North Kazakhstan region (deviation from standard + 4.4 c / ha), Akmola region (deviation from standard + 9.7 c / ha), Karaganda region (deviation from standard + 5.1 c / ha). Relatively good plasticity in the experiment showed and the variety of spring soft wheat Xn 13. In terms of productivity, this variety was above the standard: in the North Kazakhstan region + 2.6 c / ha, Akmola + 4.1 c / ha, Karaganda + 5.1 c / ha. Certainly, in the present work, the analysis of consumed research is of a reconnaissance nature and requires additional research, especially in terms of the ecological study of these varieties in arid and sharp-arid years, which are characteristic of the climate of northern and central Kazakhstan. In addition, the studied varieties belong to the intensive type of development, which requires additional study in conditions of high agrotechnical background.

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СОЛТҮСТІК ЖӘНЕ ОРТАЛЫҚ ҚАЗАҚСТАН АЙМАҒЫНДА ҚЫТАЙ СЕЛЕКЦИЯСЫНЫҢ ЖҰМСАҚ ЖАЗҒЫ БИДАЙ СОРТТАРЫН АЛДЫН-АЛА ЭКОЛОГИЯЛЫҚ СЫНАҚТАН ӨТКІЗУ НӘТИЖЕЛЕРІ

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ТҮЙІН

Осы мақалада Солтүстік Қазақстан, Ақмола және Қарағанды облыстарының климаттық жағдайларында қытай селекциясының жаздық жұмсақ бидайының сорттарының экологиялық зерттеу нәтижелері келтірілген. Солтүстік Қазақстанда (Ақмола және Солтүстік Қазақстан обл.) стандарт ретінде Астана жаздық жұмсақ бидай сорты, Орталық Қазақстанда (Қарағанды обл.) Карагандинская 22 жаздық жұмсақ бидайдың сорты қолданылды. Жазғы бидай сорттарын алдын-ала зерттеудің нәтижелері бойынша, олардың кейбіреулері Солтүстік және Орталық Қазақстанның климаттық жағдайларында жоғары өнімділікті, 1000 дән массасын, астық массасын құрайды деп көрсетті. Солтүстік Қазақстан облысы жағдайында жаздық жұмсақ бидайдың зерттелген сорттарының өнімділігі 26,3 ц/га (Хн 09) бастап 14,3 ц/га (Хн 01) дейін өзгерді, Ақмола облысында 24,0 ц/га (Хн 11) бастап 8,8 ц/га (Хн 01) дейін, Қарағанды обл. гектарына 29,7 ц/га (Хн 04) бастап 23,5 ц/га (Хн 03) дейін болды. экологиялық зерттеу нәтижелері, Солтүстік және Орталық Қазақстан өңірлерінде өсірілетін сорттарымен салыстырғанда, қытай селекциясының жаздық жұмсақ бидайының сорттары мүлдем өзгеше экологиялық түрге жататындығы анықталды.

Түйінді сөздер: экологиялық зерттеу, топырақ-климаттық жағдайлар, сорт, бидай, астық өнімділігі, генотип, экологиялық бейімділігі және тұрақтылық.

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SUMMARY

The publications present the results of an environmental study of soft wheat varieties in the North Kazakhstan, Akmola and Karaganda regions. As a standard in North Kazakhstan (Akmola and North Kazakhstan region). A variety of spring soft wheat Astana was used, in Central Kazakhstan (Karaganda region). A variety of spring soft wheat Karaganda 22. The results of a preliminary study of spring wheat varieties showed that some of them they are missing. climatic conditions of Northern and Central Kazakhstan form the overall productivity, the area of 1000 grains, the area of grain per ear. The productivity of the studied varieties of spring soft wheat in the conditions of North Kazakhstan region ranged from 26.3 c / ha (Xn 09) to 14, 3 c / ha (Xn 01), in the Akmola region it ranged from 24.0 c / ha (Xn 11) up to 8.8 centners per hectare (Xn 01), in Karagandinskaya from 29.7 centners per hectare (Xn 04) to 23.5 centners per hectare (Xn 03). The results obtained are the result of completely different environmental phenomena.

Key words: ecological study, soil and climatic conditions, variety, wheat, grain yield, genotype, ecological plasticity and stability.