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PHYSIOLOGICAL AND BIOCHEMICAL FEATURES OF VARIETIES AND LINES OF SPRING BARLEY OF DOMESTIC SELECTION

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Abstract. At present, the importance of technical crops in the use for everyday needs of people is growing day by day. Most of the world's agricultural land is intended for the cultivation of industrial crops. Every year the number of goods produced from them increases.

The article analyzes the significance of technical barley culture, the history of the study of biochemistry, biological features and biochemistry of local technical crops, namely biochemical, morphological features of barley varieties "Ilek-36", "Karabalyk 150" and lines "Ilek R-1404", "Ilek R-1302". They were grown in greenhouse conditions and phenological control was carried out. The germination of the barley variety "Ilek-36" was 98%, the germination of the variety "Karabalyk 150" 93%, the germination of the line "Ilek R-1404" 93%, the germination of the line "Ilek R-1302" 96%. The protein content according to the main method in the line "Ilek R-1404" was 16.2%, in inframatics 16.30%. The protein content in the line "Ilek R-1302" was 16.5%, in inframatics 16.60%. According to the results of the above studies, all varieties of spring barley obtained for the study are considered high-protein type. Varieties and lines of spring barley are more valuable from the point of view of nutrition and animal husbandry.

Keywords: grain forage crops, physiology, biochemistry, varieties and lines of barley, phenology, crop structure, grain quality, inframatic device.

Introduction

In the crop production of Kazakhstan, in connection with the transition to a market economy, the agro-industrial complex is facing new challenges in the direction of producing competitive products, creating and introducing new competitive varieties of domestic breeding and

modern technologies for their cultivation in risky farming zones. One of the priority crops in the Western region of Kazakhstan is such a grain crop as spring barley [1].

Barley is a very ancient agricultural crop, known since the Stone Age and occupies a special place in the history of mankind. In ancient Egypt, barley was grown about 5 thousand years BC. It is believed that he comes from Near Asia. The fact that barley was sown in Egypt for 4-5 thousand years BC is known from the writings of the Greek geographer Strabo. On the territory of the Babylonian country there is valuable data on the sowing of barley for 3100 years BC, and in the monuments of Assyria – about barley for 2200 years BC [2].

Barley grain is used in its cultivation and processing for various purposes. It is mainly used as a high-protein concentrated feed for different types and groups of farm animals (cattle, horses, pigs, poultry). At the same time, various types of cereals and beverages are obtained from it at food industry enterprises, including for children's and dietary nutrition of the population. A number of barley varieties that meet a set of technological requirements and certain biochemical parameters are used in the brewing industry.

The purpose of the scientific work is to conduct experimental studies of the biochemistry of some varieties and lines of barley culture, one of the technical crops.

In the laboratory “Plant Physiology and Biochemistry” of the Institute of Plant Biology and Biotechnology of the Ministry of Education and Science of the Republic of Kazakhstan in the period from 2012 to 2018, a high-yielding, salt-resistant, precocious variety of barley “Kaisar”, as well as a high-yielding variety of barley “Birlik” was bred [3].

The reaction of spring barley varieties from the VNIIR world collection was studied in various hydrothermal conditions of Western Kazakhstan, on the duration of the growing season and a number of economic characteristics that form the final productivity of plants. Against the background of the breeding process, a number of new promising barley varieties were evaluated for heat resistance and the strength of the root system development. Using the potential of the global gene pool, the Aktobe Research Institute of Agriculture together with the Kazakh NIIZIR have created 6 new varieties of barley for fodder and food purposes, 2 of them are approved for use in the regions of the Republic of Kazakhstan [4, 5].

Studies have established that the genetic system that controls the characteristics of: the height of the plant, the duration of the growing season, the number of grains in the ear, the protein content, includes additive, dominant and epistatic interactions of genes. Hybrid populations with highly significant non-allelic interactions were identified, reflecting the type of epistasis “additive x additive”, in which the possibility of effective selection in early generations of hybrids is predicted [6].

Identification of barley varieties with good plasticity (maintaining high yields under different conditions) is a complex task that requires long-term observations and the use of additional techniques, such as environmental testing, long-term competitive variety testing, when studying varietal characteristics by the reaction of varieties to different mineral background, sowing density, sowing period [7, 8].

Brief economic and biological characteristics of the breeding variety of spring barley "Ilek-36" of the selection of the "Aktobe Agricultural Experimental Station" LLP. In the State Register of breeding achievements of the Republic of Kazakhstan since 2016 Patent of the Republic of Kazakhstan No.757 dated 30.03.2017. The variety was bred in the Aktobe Agricultural School together with the Kazakh NIIZIR by the method of individual selection from the hybrid population "k-29917 Syabra RB", "Karabalyk 150". The variety is nutanas. Medium-ripened variety, the duration of the growing season is 70-75 days. Ear of medium length – 6-7 cm, medium density, weight of 1000 grains 40-45 g. Plant height is 60-70 cm. The shape of the bush is erect, the variety is resistant to lodging.

Yield and biological utility: in dry years in production tests (2011-2013), the average yield of the "Ilek-36" variety was 13.0 c/ha, which is 2.5-3.0 c/ha higher than that of the standard. The variety is drought-resistant and heat-resistant. Grain and grain fodder qualities are high.

A brief description of the spring barley variety "Karabalyk 150" selection of LLP "Karabalykskaya SHOS". The variety was created by hybridization and directed selection (Odessa 36 African x sample) x K-19332 (Germany), a variety of polyclinic "Medicum". In the State Register of the Republic of Kazakhstan since 1996, the variety is medium-ripened, resistant to lodging and shedding. The yield over the years of testing at the state export sites of Northern Kazakhstan amounted to 20-25 c/ha. The weight of 1000 grains is 45-50 g, the protein content is 11-14%. Cereal qualities are good.

The project was implemented within the framework of the Targeted financing Program of the Ministry of Agriculture of the Republic of Kazakhstan under the budget program 267, BR10765056 "Creation of highly productive varieties and hybrids of grain crops based on the achievements of biotechnology, genetics, physiology, biochemistry of plants for their sustainable production in various soil and climatic conditions climatic zones of Kazakhstan" [9, 10].

Materials and methods of research

The study was conducted in the testing center of the Aktobe branch of JSC "Kazagreks" and No.2 greenhouse Zhubanov.

The Luff method for determining the filminess of barley is based on the dissolution of pectin substances with a weak solution of ammonia, followed by separation of the husk, drying and weighing.

Items needed to do the job:

1. Analysis panel;
2. Technical scales with different weights;
3. Drying cabinet;
4. Water bath;
5. Buks, hanging bowls, tweezers, dissecting (injection) needle, spatula;
6. Conical flasks for 200 ml, a measuring cylinder for 50 ml;
7. 5% ammonia solution, distilled water, cotton wool.

Two samples are counted out of 50 pieces of grain and weighed on technical scales. Then each sample is placed in a conical flask with a volume of 200 ml. A mixture consisting of 150 ml of distilled water and 10 ml of 5% ammonia is poured into a flask. The flask is covered with cotton wool and put in a water bath. They are heated at 80°C for an hour, and then the liquid is drained. The swollen grains are poured onto the analysis panel and the film is removed from the grains with tweezers and a dissecting needle. First, the pods are removed from the back of the grain, and then from the middle part. The shells are placed in a pre-measured bux and dried to a constant mass. In industrial laboratories, the film can be dried at a temperature of 130°C for 40 minutes.

The composition of the shell is calculated according to the formula (1), according to which an amendment was made for the loss of shell mass during the processing of grain with ammonia in relation to the mass of 50 grains as a percentage of dry matter (the correction is 1/12 of the shell mass).

$$x = \frac{(m_p + \frac{1}{12} m_p) 100 \times 100}{\mathrm{m}_3\,(100-\omega)} = \frac{10830\, m_p}{m_3(100-\omega)}, \quad (1)$$

Where, m_3 – is the mass of 50 grains of dry barley, g; m_p – is the mass of dried pods, g; ω – is the moisture content of barley, %.

The shell is expressed as the average of two definitions.

The main method for determining the ash content of grain without the use of accelerators was approved by the Interstate Council for State Standards, Metrology and Certification on July 30, 2019. This standard is applied to grain to denote ash detection methods.

Crucibles with hangers are weighed on a scale, then the actual weight of the hook is calculated according to the mnc, the following formula (2):

$$M_{\mathrm{n}} = m_{\mathrm{tn}} - m_{\mathrm{t}}\ , \quad (2)$$

where, m_{tn} – is the mass of a crucible with a hook, g; m_t – is the mass of a free crucible, g.

Crucibles with hangers suspended on scales are placed in the door of a muffle furnace heated from 400°C to 500°C (or the door, if it is opened), and the hinges are fired, preventing the ignition of ash products. After the separation of the ash products is stopped, the crucibles are pushed into the muffle and the door is closed, after which the muffle is heated from 600°C to 900°C (bright red heating). The stench is carried out until the black particles are completely removed, until the ash color turns white or slightly gray, after which the crucibles are sent to the desiccator for cooling at ambient temperature. After cooling in the desiccator, the crucibles are weighed with a 5.3 scale, then heated in a muffle furnace at a temperature from 600°C to 900°C for at least 20 minutes. The ash content is considered complete if the mass of the ash crucibles after repeated measurements does not exceed 0.0002 g. If the mass of each of them decreases by 0.0002 g, heating is repeated again. In the case of an increase in the mass of crucibles with ash, a lower mass value is selected after overheating.

The work on determining the protein content in barley was carried out in the branch of “Kazagreks” JSC in Aktobe. According to the basic method, first of all with the help of a divider, 100 g of barley grains were measured and the grain was cleaned from spoiled grains. The refined grains were crushed and sifted. After grinding in the mill, it was dried in a drying cabinet or thermostat. In order for the material to fit freely into the Kjeldahl flask, two masses weighing no more than 0.3-0.7 g each are taken. The test tube with the nozzle is weighed on a scale and placed in the Kjeldahl flask as deep as possible. Boiling water for the production of ammonium salts. H_2SO_4 decomposes the organic matter of the sample and converts ammonium into ammonia. Then we will get a numerical calculation of ammonia by pumping acid solution and titration.

In the inframatic apparatus, first of all, grains are extracted, purified from spoiled grains, measured in a divider. Let's designate the name of the first grain to be analyzed on the device, in our case barley, that is, barley, sow the second grain and press the analysis button. After 30-50 seconds, the results of the analysis are displayed on the device screen.

In both cases of the study, the amount of protein indicates a close indicator, but an inframatic can quickly get information in 30-50 seconds.

Research results and their discussion

Phenological observations are the process of constant observations during the growing season of seasonal changes in barley plants (and other agricultural crops), their dynamics depending on the phases of growth and development, the place of growth. During the observations, seasonal observations are carried out on the basis of environmental changes; the timing of the beginning and

end of the periods of germination, tillering, exit into the tube, flowering, stages of grain maturation are determined. Observations are carried out with the establishment of calendar dates for the passage of individual phenological phases.

According to the scheme of sowing barley (Table 1) the distance between the rows of sowing was 15 cm, the depth of sowing was 5-6 cm, the number of rows was 5, the total area of sowing (plots) was 1 m^2. 50-55 pieces of seeds were sown on 1 row (1 running meter). First of all, the germination of spring barley seeds was determined (Table 2).

Table 1. Scheme of sowing varieties and lines of barley

2 different varieties and lines of barley

1 “Karabalyk 150”	2 “Ilek-36”

The distance between the rows is 15 cm.

Width-100 cm.

Per 1 meter shoulder straps = 50-55 pieces of seeds.

The sowing depth is 5-6 cm.

Phenological observations of the growth and development of the barley crop were carried out in greenhouse No.2 Zhubanov in 2 experimental variants, i.e. the lines of experiment No.1 – varieties “Ilek-36”, “Karabalyk 150”, experiment No.2 – “Ilek R-1404”, “Ilek R-1302” were taken for control.

Table 2. Germination of spring barley seeds

Crop	Number of germinated seeds by day			Germination, %
	6	9	14	
“Ilek-36”	21	45	54	98
“Karabalyk 150”	18	39	51	93
“Ilek R-1404”	37	45	51	93
“Ilek R-1302”	31	49	53	96

The above table shows the results of seed germination. After 6 days, 9 days, 14 days after sowing, the number of germinated seeds and the percentage of germination were determined (Fig. 1). The germination of the “Ilek-36” variety was 98%, the germination of the “Karabalyk 150” variety was 93%, the germination of the “Ilek R-1404” line was 93%, the germination of the “Ilek R-1302” line was 96%.

Figure 1. Stages of mass germination of barley

Phenological control was carried out from the initial phase of germination of the barley crop to the last phase of maturation (Fig.2-3) (Table 3).

Table 3. Indicators of phenological control of barley harvest

№	Crops	Growth Phase						
		Sowing	Germination	Formation of side shoots	Stem elongation	Vegetative plant parts	Flowering	All day
1	“Ilek-36”	15.12	24.12	19.01	05.02	25.03	28.04 25.05	161
	“Karabalyk 150”	15.12	24.12	19.01	03.02	25.03	28.04 25.05	161
2	“Ilek R-1404”	15.12	23.12	15.01	01.02	17-25.03	28.04 30.05	166
	“Ilek R-1302”	15.12	24.12	16.01	03.02	17-25.03	28.04 30.05	166

According to phenological control, the sowing date was December 15, germination December 24, binding January 19, stem February 5, spike March 25, occasional ripening time April

28, full ripening time corresponded to May 25 in varieties, and May 30 in lines, totaling 161 days in varieties and 166 days in lines.

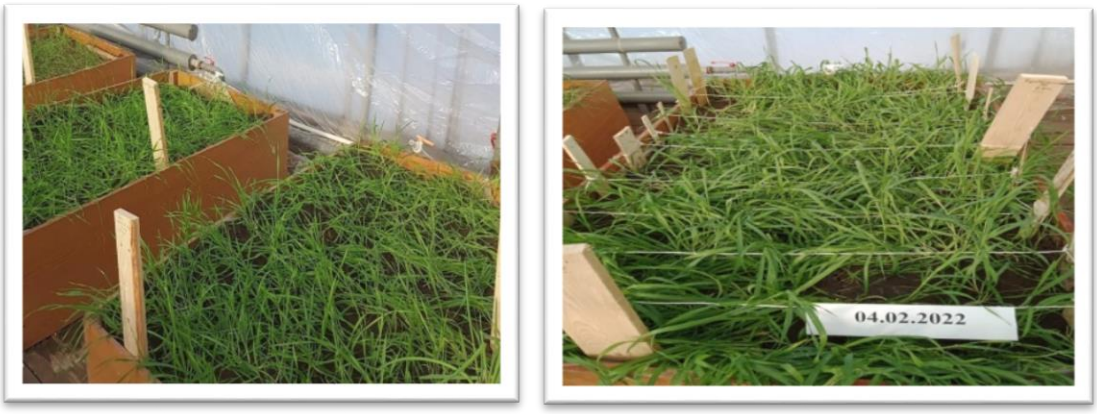

Figure 2, 3. Phases of growth and development of barley

Table 4. Results of determination of barley peeling

“Ilek-36”	“Karabalyk 150”	“Ilek R-1404”	“Ilek R-1302”
10.6	7.3	9.5	6.8

There are 3 groups of barley depending on its peel: low-cell – up to 10%; medium-cell – 10-12%; high-cell – over 12% (Fig.4).

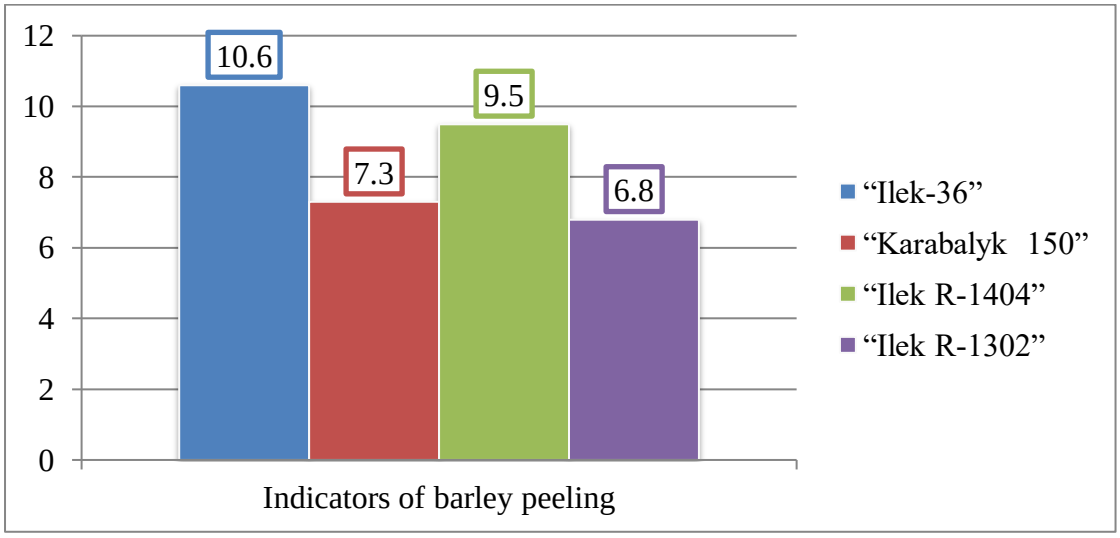

Figure 4. Indicators of barley peeling

Table 5. Results of determining the ash content of barley

“Ilek-36”	“Karabalyk 150”	“Ilek R-1404”	“Ilek R-1302”
2.50	2.80	2.70	2.80

Indicators for determining the ash content of varieties and lines of spring barley without the use of accelerators through a muffle furnace (Fig.4): “Ilek-36” - 2.50, “Karabalyk 150” - 2.80, “Ilek R-1404” - 2.70, “Ilek R-1302” - 2.80.

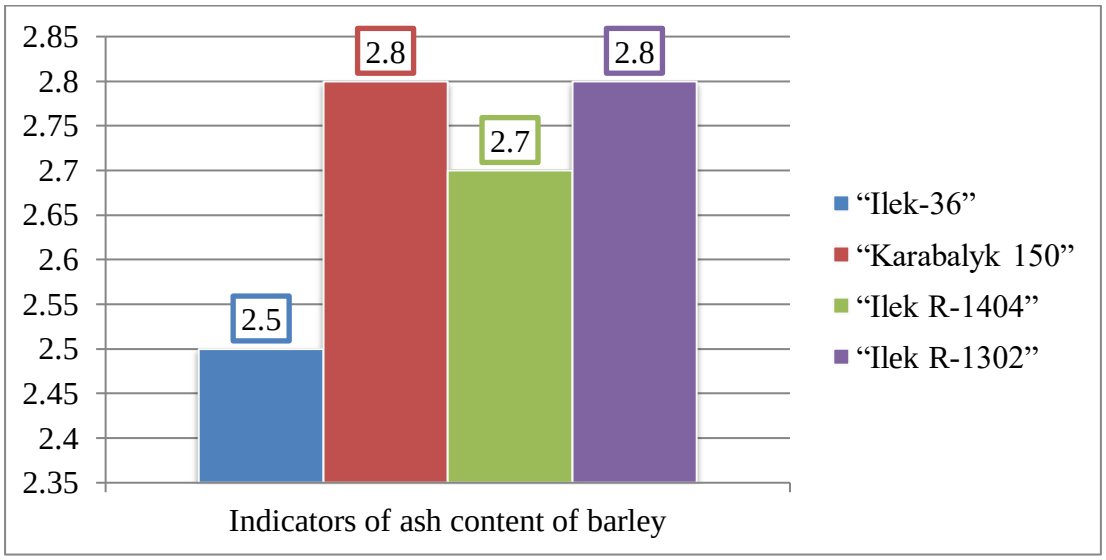

Figure 5. Indicators of ash content of barley

Based on the data below, the protein content in barley varieties and lines was determined (Table 6-7). Comparing the results, in the barley variety “Ilek-36” the protein content according to the main method was 17.2%, in the inframatic – 17.40%. In the variety “Karabalyk 150” the protein content according to the main method was – 17.6%, in the inframatic – 18.00%.

Table 6. Results of determination of nitrogen and crude protein in barley, carried out in the testing center of the Aktobe branch of “Kazagrex” JSC

“Ilek-36”	“Karabalyk 150”	“Ilek R-1404”	“Ilek R-1302”
17.2	17.6	16.2	16.5

Table 7. Indicators of protein content in informatics of barley culture, conducted in the testing center of the Aktobe branch of “Kazagrex” JSC

“Ilek-36”	“Karabalyk 150”	“Ilek R-1404”	“Ilek R-1302”
17.40	18.00	16.30	16.60

The protein content according to the main method in the line “Ilek R-1404” was 16.2%, in inframatics – 16.30%. The protein content according to the main method in the line “Ilek R-1302” was 16.5%, the indicator in inframatics was 16.60% (Fig.6).

In production, depending on the amount of protein in the barley grain, it is divided into high-protein – with a protein content in the grain of more than 12% (food and nutritional), low-protein-brewing type.

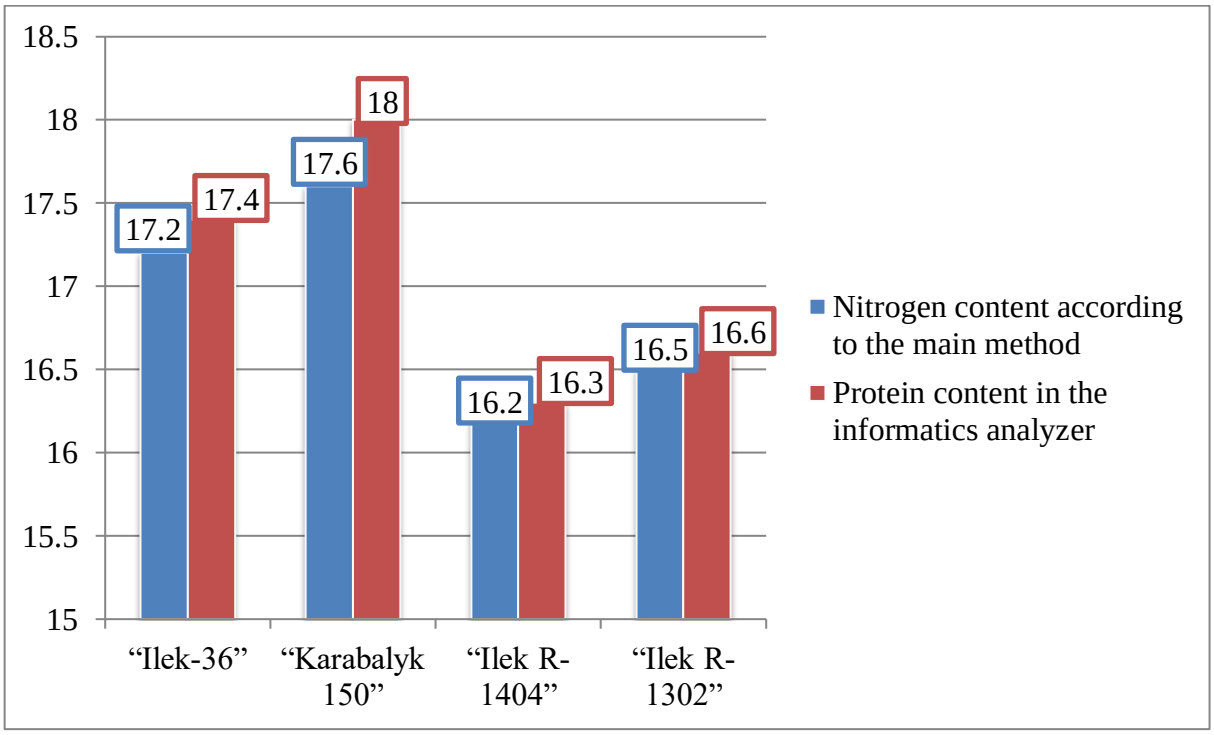

Figure 6. Comparative indicators of the amount of protein by the main method and by the laboratory analyzer

Conclusion

According to the results of the conducted research, all the presented varieties and lines of spring barley of domestic selection belong to the high-protein type. That is why all of them are of great value both for the production of high-quality food products (cereals), including dietary purposes, and are also the main type of concentrated feed for different types and groups of farm animals.

Список литературы

1. Милюткин В.А., Долгоруков Н.В. Почвозащитные сельскохозяйственные технологии и техника для возделывания сельскохозяйственных культур / А.В. Милюткин, Н.В. Долгоруков // Известия Самарской государственной сельскохозяйственной академии. – 2014. – №3. – С. 37-44.

2. Тохетова Л.А. Арал өңірінің климаттық жағдайына бейімделген жаздық арпа сорттарының моделі / А.Л. Тохетова // Актуальные проблемы науки и образования в области естественных и сельскохозяйственных наук. – 2018. – Т. 1. – №1. – С. 223-227.

3. Кулешов А.М. Сафлор-культура перспективных возможностей / А.М. Кулешов // Научно-агрономический журнал. – 2012. – №1. – С. 38-39.

4. Цыганков И.Г. Генресурсы и селекция ярового ячменя в сухостепной зоне Западного Казахстана / Г.И. Цыганков // Труды по прикладной ботанике, генетике и селекции. – 2013. – Т. 171. – С. 227-235.

5. Цыганкова М.Ю. Экологическая селекция ярового ячменя в Западном Казахстане / М.Ю. Цыганкова // Современное состояние, проблемы и перспективы развития аграрной наук. – 2018. – С. 212-213.

6. Тохетова Л.А. Генетический контроль и прогнозирование отбора по основным хозяйственно-ценным признакам ярового ячменя / Л.А. Тохетова // Вестник Прикаспия. – 2014. – №1. – С. 45-49.

7. Микхельман В.А., Пыльнев В.В., Козлова Н.А., Бессарабенко И.В. Использование реглона с целью отбора устойчивых к абиотическим факторам среды сортов ячменя / В.А. Микхельман, В.В. Пыльнев, Н.А. Козлова, И.В. Бессарабенко // Известия Тимирязевской сельскохозяйственной академии. – 2008. – №4. – С. 53-59.

8. Пыльнев В.В., Букина С.Н., Аканов Э.Н. Фотосинтетическая реакция сортов ярового ячменя на действие водного стресса / В.В. Пыльнев, С.Н. Букина, Э.Н. Аканов // Известия Тимирязевской сельскохозяйственной академии. – 2006. – №3. – С. 29-35.

9. ГОСТ 10857 – 64. Семена масличные. Метод определения масличности.

10. ГОСТ 10847 – 2019. Межгосударственный стандарт. Зерно. Методы определения зольности.

References

1. Milyutkin, V.A., Dolgorukov, N.V. (2014). Pochvozashchitnye sel'skohozyajstvennye tekhnologii i tekhnika dlya vozdelyvaniya sel'skohozyajstvennyh kul'tur [Soil-protective agricultural technologies and equipment for cultivation of agricultural crops]. Izvestiya Samarskoj gosudarstvennoj sel'skohozyajstvennoj akademii, (3), 37-44 [in Russian].

2. Tohetova, L.A., Tautenov, I.A., Demesinova, A.A., Bekova, M.K. (2018). Aral unirinin klimattik jagdaiina beiimdelgen jazdik arpa sorttarinin modeli [Model of spring barley

varieties adapted to the climatic conditions of the Aral region]. Aktual'nye problemy nauki i obrazovaniya v oblasti estestvennyh i sel'skohozyajstvennyh nauk, (1), 223-227, [in Kazakh].

3. Kuleshov, A.M. (2012). Saflor_kultura perspektivnih vozmojnostei [Safflower is a culture of promising opportunities]. Nauchno-agronomicheskij zhurnal, (1 (90)), 38-39, [in Russian].

4. Cygankov, I.G., Cygankov, V.I., Sariev, B.S., Shaninov, T.S., Cygankova, M.Yu. (2013). Genresursi i selekciya yarovogo yachmenya v suhostepnoi zone Zapadnogo Kazahstana [Geo-resources and breeding of spring barley in the dry steppe zone of Western Kazakhstan]. Trudy po prikladnoj botanike, genetike i selekcii, 171, 227-235, [in Russian].

5. Cygankova, M.Yu., Cygankov, V.I., Shaninov, T.S., Cygankov, A.V. (2018). Ekologicheskaya selekciya yarovogo yachmenya v Zapadnom Kazahstane [Ecological breeding of spring barley in Western Kazakhstan]. Sovremennoe sostoyanie, problemy i perspektivy razvitiya agrarnoj nauk, 212-213, [in Russian].

6. Tohetova, L.A. (2014). Geneticheskii kontrol i prognozirovanie otbora po osnovnim hozyaistvenno_cennim priznakam yarovogo yachmenya [Genetic control and prediction of selection according to the main economically valuable characteristics of spring barley]. Vestnik Prikaspiya, (1), 45-49, [in Russian].

7. Mikhel'man, V.A., Pyl'nev, V.V., Kozlova, N.A., Bessarabenko, I.V. (2008). Ispolzovanie reglona s celyu otbora ustoichivih k abioticheskim faktoram sredi sortov yachmenya [The use of raglan for the selection of barley varieties resistant to abiotic environmental factors]. Izvestiya Timiryazevskoj sel'skohozyajstvennoj akademii, (4), 53-59, [in Russian].

8. Pyl'nev, V.V., Bukina, S.N., Akanov, E.N. (2006). Fotosinteticheskaya reakciya sortov yarovogo yachmenya na deistvie vodnogo stressa [Photosynthetic reaction of spring barley varieties to the effect of water stress]. Izvestiya Timiryazevskoj sel'skohozyajstvennoj akademii, (3), 29-35, [in Russian].

9. GOST 10857 – 64. Semena maslichnie. Metod opredeleniya maslichnosti [GOST 10857 – 64. Oilseeds. Method of determination of oil content], [in Russian].

10. GOST 10847 – 2019. Mejgosudarstvennii standart. Zerno. Metodi opredeleniya zolnosti [GOST 10857 – 64. Interstate standard. Seed. Methods for determining ash content], [in Russian].

ОТАНДЫҚ СЕЛЕКЦИЯНЫҢ ЖАЗДЫҚ АРПА СОРТТАРЫ МЕН ЛИНИЯЛАРЫНЫҢ ФИЗИОЛОГИЯЛЫҚ ЖӘНЕ БИОХИМИЯЛЫҚ ЕРЕКШЕЛІКТЕРІ

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Аңдатпа. Қазіргі таңда адамдардың тұрмыс қажеттілігіне пайдаланудағы техникалық дақылдардың маңызы күннен күнге артуда. Әлемдік ауыл шаруашылық жерлерінің көп бөлігі техникалық дақылдарды өсіруге арналған. Жыл сайын олардан өндірілетін тауарлар саны артып келеді.

Мақалада техникалық арпа дақылының маңызына, биохимиясының зерттелу тарихына талдау жасалды, жергілікті техникалық дақылдардың биологиялық ерекшеліктері мен биохимиясы, атап айтқанда арпаның «Илек-36», «Қарабалық 150» сорттары мен «Илек Р-1404», «Илек Р-1302» линияларының биохимиялық, морфологиялық ерекшеліктері қарастырылды. Жылыжай жағдайында өсіріліп, фенологиялық бақылау жасалды. Арпаның «Илек-36» сортының өнгіштігі 98%, «Қарабалық 150» сортының өнгіштігі 93%, «Илек Р-1404» линиясының өнгіштігі 93%, «Илек Р-1302» линиясының өнгіштігі 96%-ды құрады. «Илек Р-1404» линиясындағы негізгі әдіс бойынша белок мөлшері 16,2%, инфраматиктегі көрсеткіш 16,30% болды. «Илек Р-1302» линиясындағы негізгі әдіс бойынша белок мөлшері 16,5%, инфраматиктегі көрсеткіші 16,60% көрсетті. Жоғарыдағы зерттеулер нәтижесі бойынша зерттеуге алынған жаздық арпа сорттарының барлығы жоғары белокті тип болып саналады. Жаздық арпа сорттары мен линиялары тағамдық және малазықтық тұрғыдан қарағанда құнды.

Түйін сөздер: астық-жемдік дақылдар, физиология, биохимия, арпаның сорттары мен линиялары, фенология, дақыл құрылымы, астық сапасы, инфрақұрылым аспабы.

ФИЗИОЛОГИЧЕСКИЕ И БИОХИМИЧЕСКИЕ ОСОБЕННОСТИ СОРТОВ И ЛИНИЙ ЯРОВОГО ЯЧМЕНЯ ОТЕЧЕСТВЕННОЙ СЕЛЕКЦИИ

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Аннотация. В настоящее время значение технических культур в использовании для бытовых нужд людей растет день ото дня. Большая часть мировых сельскохозяйственных угодий предназначена для выращивания технических культур. С каждым годом количество производимых из них товаров увеличивается.

В статье проведен анализ значения культуры ячменя технического, истории изучения биохимии, рассмотрены биологические особенности и биохимия местных технических культур, а именно биохимические, морфологические особенности сортов ячменя «Илек-36», «Карабалык 150» и линий «Илек Р-1404», «Илек Р-1302». Выращивали в тепличных условиях и проводили фенологический контроль. Всхожесть сорта ячменя «Илек-36» составила 98%, всхожесть сорта «Карабалык 150» 93%, всхожесть линии «Илек Р-1404» 93%, всхожесть линии «Илек Р-1302» 96%. Содержание белка по основному методу в линии «Илек Р-1404» составило 16,2%, в инфраматике 16,30%. По основному методу в линии «Илек Р-1302» содержание белка составило 16,5%, в инфраматике 16,60%. Согласно результатам вышеуказанных исследований, все сорта ярового ячменя, полученные для исследования, считаются высокобелковым типом. Сорта и линии ярового ячменя более ценны с точки зрения питания и животноводства.

Ключевые слова: зернофуражные культуры, физиология, биохимия, сорта и линии ячменя, фенология,структура урожая, качество зерна, прибор инфраматик.