

## Creation of Drought-Resistant Varieties of Soft Wheat

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**Abstract:** It is known that in recent years, changes in nature have led to a number of negative consequences, especially in the cultivation of crops. It is important to select drought-resistant varieties of cereals and introduce them into dry areas. In this work, two-season (two-handle) varieties and lines of wheat are defined as drought-resistant under laboratory conditions. According to the results of studies in 15% sucrose solution, 2 lines were highly resistant, 1 line - moderately resistant and 1 line - moderately weakly resistant relative to the control. Studies of these lines are given.

**Keywords:** two-season, facultative, varieties, line, drought, line, resistant line.

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### INTRODUCTION

Global climate change observed in recent years has led to an increase in air temperature, dry winds caused by a sharp drop in relative humidity in the summer months, atmospheric and soil drought. Today, when water problems are acute, it is very important to rationally use water and introduce economical agricultural technologies, as well as grow drought-resistant crops.

Significant weather changes and low rainfall in the middle of spring in some years on the country's arable land adversely affect the yield and quality of grain. One example is the very low rainfall in the spring of 2021, which reduced the chances of crops being harvested on arable land. Drought resistance is directly related to the anatomical and morphological properties of the plant, which reduce the evaporation of water, cells, dehydration of the cell cytoplasm, physiological resistance to heat and salt concentration, biology of growth and development.

Drought is one of the most common environmental factors affecting plant growth and development. In drought conditions, the water regime of wheat gradually worsens. Usually, drought does not lead to the death of plants, but metabolism is disturbed, as a result of which the number of ears, the number of grains per ear and the mass of grain decrease. Drought-resistant varieties have the ability to effectively use the available moisture reserves in the soil due to a powerful developed root system. Drought remains one of the biggest challenges facing agricultural researchers and breeders.

### Drought Seed Rating Scale

### ANALYSIS OF THE RELEVANT LITERATURE

In this regard, one of the urgent tasks facing wheat breeding is the creation of drought-resistant varieties with a powerful root system that effectively uses moisture and nutrients accumulated in the lower soil layers [2].

Drought has a serious impact on agricultural crops. Drought affects not only the growth and development of plants, but also dramatically affects the yield of grain [4;]. In the last months of spring and summer in wheat fields, several factors influence the growth, development and yield of cultivated wheat varieties [5; 6].

### METHOD OF RESEARCH

At the Research Institute of Southern Agriculture of Agriculture, he conducts research on the creation of varieties of grain that are resistant to environmental factors. Within the framework of the project PZ-2020103083 "Creation of new two-season (wall) wheat varieties resistant to drought, rust, with high grain quality" in the laboratory of plant physiology and biochemistry of the Institute, drought resistance was assessed by determining the germination of seeds at high osmotic pressure in a sucrose solution based on methodical manual Kozhushko. [3]. 50 grains and 10 ml of the prepared 15% sucrose solution were placed in each Petri dish. Seeds were grown at 210C in a thermostat on filter paper. After 3 days, the germination energy was determined, and after 7 days, seeds germinate at osmotic pressure in the solution and compared with the control variant. The control of seed germination was carried out in distilled water. Germination is expressed as a percentage.

Sustainability Group	Degree of stability, %	Classification
I	0-20	Unstable
II	21-40	Weakly resistant
III	41-60	Medium resistant
IV	61-80	Above average durability
V	81-100	highly resistant

The level of drought resistance was studied under laboratory conditions in competitive variety testing using seeds of 25 varieties and lines of seasonal wheat. The State Register includes standard varieties of spring wheat Janub Gavhari and Gallakor. As a standard, the varieties of spring wheat "Dzhanub Gavhari" and "Gallakor" included in the State Register were selected.

Analysis and results: Germination of varieties and lines under normal conditions is 54-88%, germination 68-100%, number of roots 2-5, root length 1.94-7.32 cm, coleoptile yield 0.41-3.24 cm .

Seed germination in sucrose solution from 25 varieties and lines of 4 varieties proved to be stable. The highest indicators were on KR20-20thHTSBWYT-38 and KR20-20thESBWYT-12 lines of high resistance and the degree of resistance was 82-90%, KR19-19thDSBWYT-29979 line with resistance above average was 78%, KR20-20thHTSBWYT-41 line of medium resistance was 44% . This certainly indicates that the lines are drought-resistant.

When assessing the drought resistance of varieties and lines, the number and length of roots when seeds are soaked in a sucrose solution are important indicators. Selected as drought-resistant 4 lines, the average number of roots in the control variant was 3-4, and with sucrose solution, the number of roots was 2-3. The root length was 4.71-6.20 cm in the control variant and 0.71-2.13 cm in the sucrose solution. The length of the coleoptile is

also important to ensure the early emergence of the young stem of the plant to the surface. Seed germination in distilled water in the control variant, the coleoptile length was 0.41-3.61 cm, and in the sucrose solution, the highest coleoptile length in the KR20-20thHTSBWYT-41 line was 0.91 cm, KR20-20thHTSBWYT-41 line was 0.91 cm, the KR20-20thESBWYT-12 line was 0.67 cm, while the KR19-19thDSBWYT-29979 line was 0.63 cm, the smallest value was the coleoptile length was 0.14 cm in the KR20-20thHTSBWYT-38 line.

Global climate change in recent years has led to an increase in air temperature, dry winds caused by a sharp drop in relative humidity in the summer months, atmospheric and soil drought. In the current period of serious water problems, it is very important to rationally use water and introduce economical agricultural technologies, as well as grow varieties of cereals with high drought tolerance.

## CONCLUSIONS AND SUGGESTIONS

Thus, the selection of drought-resistant varieties is one of the most urgent tasks of breeding today. When studying drought resistance in a solution of sucrose of two-season wheat varieties and tench of 25 varieties, 2 lines turned out to be highly resistant, and 1 line was rated as above average resistance, and 1 line was moderately resistant. Recommendations are given to breeders on the transfer of these tenches to the next stages of breeding.

*Table1: Evaluation of drought-resistant varieties and lines of soft wheat*

	Name	Germination energy		Germination		Number of roots		Root length		Coleoptile output	
		Contr ol	sucro se 15%	Contr ol	sucro se 15%	Contr ol	sucro se 15%	Contr ol	sucro se 15%	Contr ol	sucro se 15%
1	J. Gavhari	80	0	0	0	4	0	5.04	0	2,28	0
2	KR19-19thDSBWYT-29639	82	0	0	0	3	0	3,69	0	1,93	0
3	KR20-	74	0	0	0	4	0	5,28	0	2,53	0

	20thDSBWYT-04										
4	KR20-20thDSBWYT-49	66	0	0	0	4	0	4,86	0	2,82	0
5	KR20-20thHTSBWYT-35	82	0	0	0	3	0	4,34	0	1,46	0
6	Gallacor	80	0	0	0	4	0	7,32	0	3,24	0
7	KR19-19thDSBWYT-29782	76	0	0	0	3	0	5,5	0	2,4	0
8	KR20-20thDSBWYT-05	68	0	0	0	3	0	4,55	0	2,26	0
9	KR20-20thESBWYT-05	70	0	0	0	3	0	4,85	0	2.17	0
10	KR20-20thHTSBWYT-38	82	62	96	90	4	3	4,71	0,91	3	0,14
11	17 th SBWYT-2017-P-17	88	0	0	0	4	0	3,84	0	2,55	0
12	KR19-19thDSBWYT-29872	64	0	0	0	3	0	5,29	0	2,95	0
13	KR20-20thDSBWYT-07	72	0	0	0	3	0	3,62	0	1,75	0
14	KR20-20thESBWYT-12	76	58	100	82	4	2	5,47	1,76	2,38	0,67
15	KR20-20thHTSBWYT-41	82	38	98	44	3	3	4,97	0,71	1572	0,91
16	17 th SBWYT-2017-P-6	68	0	0	0	4	0	5,48	0	2,61	0
17	KR19-19thDSBWYT-29979	78	56	94	78	3	3	6.2	2.13	3.11	0,63
18	KR20-20thDSBWYT-26	64	0	0	0	4	0	4.0	0	2,47	0
19	KR20-20thESBWYT-39	68	0	0	0	2	0	1,94	0	0,57	0
20	KR20-20thHTSBWYT-45	80	0	0	0	5	0	6.14	0	3,22	0
21	17 th SBWYT-2017-P-72	86	0	0	0	4	0	3,51	0	2,22	0
22	KR19-19thDSBWYT-30140	84	0	0	0	4	0	4.12	0	3,61	0
23	KR20-20thDSBWYT-44	54	0	0	0	3	0	1,96	0	0,41	0
24	KR20-20thESBWYT-46	74	0	0	0	4	0	3,6	0	1,8	0
25	KR20-20thHTSBWYT-48	88	0	0	0	4	0	6.23	0	2,86	0

## REFERENCES

1. Genkel, P.A. (1975). *Physiology of plants*. Moscow Enlightenment.
2. Mavlonov Zh.S., Karshiboev Kh.Kh. Laboratory assessment of drought resistance of durum wheat varieties and lines// Proceedings of the international scientific-practical conference "Actual issues of agricultural production and prospects for its development", dedicated to the 85th anniversary of Professor Halima Nazarovna Atabayeva and the 67th anniversary of scientific and pedagogical activity. Tashkent-2020. Part 1. -pp.165-168.
3. Casing. N.N. Study of drought resistance of the world gene pool of spring wheat for breeding purposes (methodological guide) /

- N.N. Kozhushko. - L. : VIR Publishing House, 1991.
4. Qarlibaevna, Berdimuratova Alima; Yusupbay, Alimbetov; Sabirovna, Kamalova Khatira; ,ABOUT THE ACTIVITY TASKS OF THE EDUCATION SYSTEM IN THE REPUBLIC OF KARAKALPAKSTAN,Ижтимоий фанлар,2,3,,2020,
  5. Бердимуратова, АК; Алимбетов, Ю; Камалова, ХС; ,О СОСТОЯНИИ ОБЕСПЕЧЕНИЯ НАСЕЛЕНИЯ ПИТЬЕВОЙ ВОДОЙ И ЕГО ВЛИЯНИИ НА СОЦИАЛЬНУЮ УСТОЙЧИВОСТЬ ОБЩЕСТВА РЕСПУБЛИКИ КАРАКАЛПАКСТАН (НА МАТЕРИАЛАХ СОЦИОЛОГИЧЕСКОГО ОБСЛЕДОВАНИЯ НАСЕЛЕНИЯ РЕСПУБЛИКИ В МАРТЕ-АПРЕЛЕ 2016 ГОДА),Актуальные проблемы многоуровневой языковой подготовки в условиях модернизации высшего образования,,,70-86,2017,
  6. Бердимуратова, АК; Алимбетов, Ю; Камалова, ХС; ,НЕКОТОРЫЕ АСПЕКТЫ ДЕЯТЕЛЬНОСТИ ОРГАНОВ САМОУПРАВЛЕНИЯ ГРАЖДАН И ИХ ВЛИЯНИЕ НА СОЦИАЛЬНУЮ СТАБИЛЬНОСТЬ В РЕСПУБЛИКЕ КАРАКАЛПАКСТАН,Актуальные проблемы многоуровневой языковой подготовки в условиях модернизации высшего образования,,,55-70,2017,
  7. Алимбетов, Юсупбай; Камалова, Хатира Сабыровна; ,QARAQALPAQSTAN RESPUBLIKASI TA'LIM SISTEMASININ'ISKERLIK MA'SELESI HAQQINDA,Журнал Социальных Исследований,3,2,,2020,
  8. Алима, Бердимуратова; ,Х? зирги заман глобалласыу маш?алалары: ??дири х?м ??тери,Бестник Каракалпакского университета,25,4,68-75,2014,Каракалпакский государственный университет
  9. Бердимуратова, АК; Бердимуратова, СП; ,ИСТОРИЯ. СОЦИОЛОГИЯ. ФИЛОСОФИЯ. ЮРИСПРУДЕНЦИЯ.,Вестник КГУ им. Бердаха. №,1,,50,2021,
  10. Бердимуратова, А; ,Экологический кризис Приаралья и проблемы его решения.,Экономика и статистика,,11-12,70,1997,
  11. Бердимуратова, А; ,Массалы? м?деният социаллы? ?убылыс сыпатында,ВЕСТНИК КАРАКАЛПАКСКОГО ГОСУДАРСТВЕННОГО УНИВЕРСИТЕТА ИМЕНИ БЕРДАХА,34,1,52-55,2017,
  12. Qarlibaevna, B. A., Yusupbay, A., & Sabirovna, K. K. (2020). ABOUT THE ACTIVITY TASKS OF THE EDUCATION SYSTEM IN THE REPUBLIC OF KARAKALPAKSTAN. *Ижтимоий фанлар*, 2(3).
  13. Бердимуратова, А. К., Алимбетов, Ю., & Камалова, Х. С. (2017). О СОСТОЯНИИ ОБЕСПЕЧЕНИЯ НАСЕЛЕНИЯ ПИТЬЕВОЙ ВОДОЙ И ЕГО ВЛИЯНИИ НА СОЦИАЛЬНУЮ УСТОЙЧИВОСТЬ ОБЩЕСТВА РЕСПУБЛИКИ КАРАКАЛПАКСТАН (НА МАТЕРИАЛАХ СОЦИОЛОГИЧЕСКОГО ОБСЛЕДОВАНИЯ НАСЕЛЕНИЯ РЕСПУБЛИКИ В МАРТЕ-АПРЕЛЕ 2016 ГОДА). In *Актуальные проблемы многоуровневой языковой подготовки в условиях модернизации высшего образования* (pp. 70-86).
  14. Бердимуратова, А. К., Алимбетов, Ю., & Камалова, Х. С. (2017). НЕКОТОРЫЕ АСПЕКТЫ ДЕЯТЕЛЬНОСТИ ОРГАНОВ САМОУПРАВЛЕНИЯ ГРАЖДАН И ИХ ВЛИЯНИЕ НА СОЦИАЛЬНУЮ СТАБИЛЬНОСТЬ В РЕСПУБЛИКЕ КАРАКАЛПАКСТАН. In *Актуальные проблемы многоуровневой языковой подготовки в условиях модернизации высшего образования* (pp. 55-70).
  15. Алимбетов, Ю., & Камалова, Х. С. (2020). QARAQALPAQSTAN RESPUBLIKASI TA'LIM SISTEMASININ'ISKERLIK MA'SELESI HAQQINDA. *Журнал Социальных Исследований*, 3(2).
  16. Алима, Б. (2014). Х? зирги заман глобалласыу маш? алалары:?? дири х? м?? тери. *Бестник Каракалпакского университета*, 25(4), 68-75.
  17. Бердимуратова, А. К., & Бердимуратова, С. П. (2021). ИСТОРИЯ. СОЦИОЛОГИЯ. ФИЛОСОФИЯ. ЮРИСПРУДЕНЦИЯ. *Вестник КГУ им. Бердаха*. №, 1, 50.
  18. Бердимуратова, А. (1997). Экологический кризис Приаралья и проблемы его решения. *Экономика и статистика*, (11-12), 70.
  19. Uli, P. N. R. (2021). Development of a Person's Spirituality in Dialogue with Another. *Zien Journal of Social Sciences and Humanities*, 1(1), 133-135.

20. Gerduang, A., Panwatanasakul, C., & Nurnazar, P. (2021). THE DESIRABLE MANAGEMENT OF EDUCATION IN URBANIZATION AREA UNDER THE OFFICE OF NON-FORMAL AND INFORMAL EDUCATION IN BANGKOK THAILAND. *湖南大学学报 (自然科)*, 48(10).
21. Gerduang, A., Panwatanasakul, C., & Nurnazar, P. (2021). The Development of Administrators Affiliated with the Office of Non-Formal and Informal Education (NFE). *Review of International Geographical Education Online*, 11(9).
22. Nurnazar, P., & Islambek, S. (2022). HUMANISM OF SOCIOLOGY AND SOCIOLOGY OF HUMANISM. *Uzbek Scholar Journal*, 2, 11-14.
23. Nurnazar, P., & Islambek, S. (2022). HUMANITY AS AN EXPRESSION OF THE SPIRITUAL BEING OF HUMAN. *Uzbek Scholar Journal*, 2, 15-19.
24. Пирназаров, Н. Р., & Баймурзаев, А. (2017). ФИЛОСОФСКОЕ МИРОВОЗЗРЕНИЕ-ЛОГИЧЕСКАЯ ОСНОВА ДУХОВНОСТИ. *Ученый XXI века*, 36.
25. Nurnazar, P. (2022). Ecology of the Soul: Culture, Morality, Spirituality. *Indiana Journal of Agriculture and Life Sciences*, 2(2), 5-8.
26. Hamayun M., Khan S.A., Khan A.L., Shinwari Z.K., Iqbal I., Sohn E-Y., Khan M.A., Lee I-J. Effect of salt stress on growth attributes and endogenous growth hormones of soybean cultivar Hwang keumkong. *Pakistan Journal of Botany*, 2010. №42(5). -P. 103-112).
27. Rane J., Pannu R. K., Sohu V. S., Saini R. S., Mishra B., Shoran J., Crossa M., Vargas J. and Joshi A. K. Performance of yield and stability of advanced wheat genotypes under heat stressed environments of Indo-Gangetic plains. *Crop Sci.* 47: 2007. -PP. 1561-1573.