European Journal of Agricultural and Rural Education (EJARE)
Available Online at: https://www.scholarzest.com
Vol. 4 No. 06, June 2023
ISSN: 2660-5643

RESULTS OF SCIENTIFIC RESEARCHS IN THE DEVELOPING OF SUITABLE VARIETIES OF BREAD WHEAT IN RAINFED LANDS.

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Article history:

Received: 7th April 2023
Accepted: 10th May 2023
Published: 7th June 2023

Abstract:

One of the main problems today is the creation of bread wheat varieties suitable for the soil and climate conditions of different regions of dry lands of the Republic of Uzbekistan, resistant to early spring, drought, heat, disease and pests, lodging, grain yield of 20-25 t/ha and more. As a result of the research, samples of early spring varieties of bread wheat were selected.

Keywords: Rainfed lands, bread wheat, growth period, heading, ripening, early ripening, varietices, line, grain yield, grain quality, selection.

INTRODUCTION. The consequences of the global warming of the world's climate are felt in the dry regions of the Uzbekistan. Climate change will have a negative impact on the food security of the population living in rainfed regions.

The varieties of bread wheat grown on more than 200 thousands hectares of dry land in Uzbekistan are severely damaged by adverse environmental conditions (heat and drought).

Selection of bread wheat collection varieties for planting in dry lands and creating varieties resistant to adverse environmental conditions, fertile and with high grain quality in the process of selection increases grain yield to 8-10 t/ha on average. Also, the protein in the grain increases by 2-3%, gluten by 5-10%.

Therefore, the creation of bread wheat varieties with early, grain ripening phase in short days (25-30 days) ensures an increase in grain yield in dry lands.

MAIN PART. Creation of early or ultra-early varieties of bread wheat in dryland farming is of great importance in wheat selection today. Short and dry spring months, air temperature rising to anomalous levels during the grain filling period affect grain yield and quality in wheat.

According to researchers such as P.P.Lukyanenko [2], P.K.Ivanov [1], the length of the wheat plant's growth period is one of the most important parameters. This feature depends on the genetic structure of the wheat plant, as well as the conditions under which it is grown, soil-climate and meteorological conditions, agro-technology of cultivation, planting period, and the time of grass emergence in autumn. During the growing season of a wheat plant, the plant's developmental phases can occur at different times in different years.

The duration of the germination-heading period depends on the biological characteristics of the variety, and air temperature and day length play a key role [5, 6, 1, 4].

Development of early varieties of bread wheat provides resistance to heat and drought. The length of the germination-heading period is considered important in determining precocity [7]. In Central Asia, the earliness of the wheat plant is determined by the heading phase [3]. According to R.A.Udachin, I.Sh.Shakhmedov [6], the growth period of the plant in grain crops is divided into two: 1. Germination-heading. 2. Spike-ripening.

The duration of the heading-ripening period mainly depends on the air and soil temperature, as well as the irrigation conditions. In the studies of A.I. Nosatovsky [5], the most favorable conditions for the period of grain filling and ripening of grain are observed in conditions where the average daily air temperature is 16-200C, air humidity is not less than 50%, with sufficient moisture in the soil. When the air temperature is higher than the above values, the period of grain filling and the duration of grain ripening is shortened, and on the contrary, at low temperature, the period of grain ripening is extended [7].

MATERIALS AND METHODS. In the course of scientific research, bread wheat variety samples and lines available in the "Bread wheat genetics, selection and breeding" laboratory of the Research Institute Rainfed Agriculture, as well as variety samples brought from ICARDA and SIMMYT international scientific centers, were planted and studied in the experimental field of the institute. During the research, the Tezpishar variety of bread wheat was used as a standard.

In the 2021-2022 agricultural year, it was observed that the amount of precipitation was 33.4 mm more than the average long-term indicators, the air temperature was -2.1^{0}C lower, and the relative air humidity was 4% lower.

Precipitation in October is around the multi-year average (17.1 mm), air temperature is -2.1^{0}C lower than the multi-year average (12.1^{0}C), precipitation in November is less than the multi-year average (35 mm) by -34.6 mm, air temperature is lower by -1.6^{0}C, precipitation in December is -41.6 mm less than the long-term average, and air temperature is 3.5^{0}C higher. During these months, the lack of moisture and temperature in the soil had a negative effect on the germination of seeds and field fertility. In January and February, the amount of precipitation was higher than the average long-term standards, and the air temperature in the soil was sufficient, which created conditions for the germination of crops.

The long duration of the germination phase had a negative effect on the field fertility of the seeds. In March, the precipitation was 108.6 mm more than the average long-term average, and the air temperature was -0.70C lower than the average, which had a positive effect on the growth and development of plants. In April, it was observed that the amount of precipitation was -14.3 mm less than the long-term average, and the air temperature was +5.50C higher than the long-term average, which had a negative effect on the growth and development of plants.

In this month, it was observed that the rapid growth and accumulation of biomass, the formation of productivity elements, the productivity and other valuable economic indicators were negatively affected.

RESULTS AND DISCUSSIONS. Bread wheat lines brought from SIMMYT and ICARDA international research centers were evaluated according to growth period and early lines were identified.

Germination in Tezpishar variety in 2020 is 05.01. at, spike 30.04. at and fully ripe 5.06. was observed, the length of the heading-ripening period was 36 days, and the germination-ripening period was 151 days.

The day of germination in the lines located in the nursery of 26TH SEMI-ARID WHEAT YEALD TRIAL (SIMMYT) is 05.01. corresponding to the spike phase 03.05.-10.05. and the full ripening phase is 11.06.-16.06. it was observed that it coincided with Also, the duration of the heading-ripening period of these lines was 35-40 days, the germination-ripening period was 157-162 days, and it was determined that the ripening phase was late compared to the Tezpishar variety.

#7 (NADI//TRCH/HUIRIVIS#1/3/NADI) and #8 (KACHU#1/3/-T.DICOCCONPI94624/AE.-SQUARROSA (409)//) from 39TH ELITE SELECTION WHEAT YEALD TRIAL (SIMMYT) kennel. BCN), #9 (KINGBIRD#1//-INQALAB91*2/TUKURU/3/-BECARD/FRNCLN) lines can be seen to be equal or close to the model variety in terms of growth period.

CWANA 18th SBWON-HT-2017/2018 was distinguished by its superiority over the Tezpishar variety in terms of precocity and short growing season. In Plot-35.KAUZ//ALTAR 84/AOS 3/KAUZ/3/CATBIRD10/4/MILAN/-DUCULA and Plot-38.ATTILA*2/RAYON//CATBIRD-1, spikes start 4-6 days early and spike - has early ripening and germination-ripening indicators.

Also, the growth period of line #16 (Erythrospermum-2020), which was selected by individual selection from Erythrospermum-2003, was 139 days. The growth period of this variety ended 12 days earlier than the standard variety, and it was found to be ultra-precocious compared to Tezpishar variety and other varieties according to all indicators of precocity.

Germination in Tezpishar variety in 2021 15.02. at, spike 12.05. at and fully ripe 17.06. it was observed that it was in days, the period of heading-ripening was 36 days and the period of germination-ripening was 122 days.

26TH SAWYT (SIMMYT), the spike phase is 14.05.-18.05. and the full ripening phase is 15.06.-23.06. it was observed that it coincided with These lines took 32-36 days to germinate and 120-128 days to germinate, FRET2*/BRAMBLING//BECARD/3/WBLL1*2/BRAMBLING*2/4, BORL14*2//KFA/-2KACHU It was found that lines of WHEAR/KUKUNA/3/C80.-1/3*BATAVIA//2*WBLL1/4/QUAIU/5 and KACHU/BECARD//WBLL1*2/BRAMBLING/3/-KACHU/KINDE are late.

It was observed that the lines in the 39TH ESWYT nursery were earlier than Tezpishar.

Plot-35.KAUZ//ALTAR 84/AOS 3/KAUZ/3/CATBIRD-10/4/MILAN/DUCULA and Plot-38 in CWANA 18th SBWON-HT-2017/2018 nursery. ATTILA*2/RAYON//-CATBIRD-1 lines were found to ripen 5-8 days earlier than the Tezpishar variety.

Germination in Tezpishar variety in 2022 10.02. at, spike 03.05. at and fully ripe 07.06. days, the period of heading-ripening was 35 days, and the period of germination-ripening was 117 days. 26th SEMI-ARID WHEAT YEALD TRIAL (SIMMYT) also has a germination date of 10.02. to, spike phase 30.04.-08.05. and the full ripening phase is 03.06.-11.06. days. Also, the duration of the heading-ripening period of these lines was 33-35 days, and the germination-ripening period was 113-118 days. According to the maturation phase, FRET2*/BRAMBLING-//BECARD/3/WBLL1*2/BRAMBLING*2/4 and BORL14*2//KFA/-2KACHU lines were found to be early compared to Tezpishar.

Lines #7 (NADI//TRCH/HUIRIVIS#1/3/NADI) and #9 (KINGBIRD#1//-INQALAB91*-2/TUKURU/3/BECARD/FRNCLN) in the 39TH ELITE SELECTION WHEAT YEALD TRIAL nursery by growth period it was found that the sample ripened 6 days earlier than the variety.

CWANA 18th SBWON-HT-2017/2018 belonging to the international center of ICARDA was distinguished by its superiority over the Tezpishar variety in terms of precocity and short growth period. Also, the growth period of the Erythrospermum-2020 line #16 was 107 days, and it was found to be 11 days earlier than the Tezpishar variety and other lines according to the indicators of early ripening.

According to the results of a three-year study, the average duration of heading-ripening in the Tezpishar (pattern) variety was 36 days, and the growing period was 136 days. We can observe that different weather conditions over the years had a different effect on the duration of heading-ripening and germination-ripening phases of varieties and lines.

Weather conditions and different seed germination times showed that the growth phases varied among varieties and lines.

It was found that the growth period and the ear-ripening period of the Tezpishar variety were 151, 122, 117 days and 36, 36 and 35 days, respectively, and the difference in the heading-ripening phase was small.

According to the data, the heading-ripening phase in line #-5 (FRET2*/BRAMBLING//BECARD/3/WBLL1*2/BRAM-BLING*2/4) is 40 days in 2020, 32 in 2021 and 33 in 2022, which indicator 39, 33, 34 days in line #-6 BORL14*2//KFA/2KACHU, respectively 38, 34, 32 in line #-10 SUP152/BAJ#1/3/-KACHU//WBLL1*-2/BRAMBLING -13 KACHU//WBLL1*2 /BRAMBLING-/3/BAJ#1/AKURI/4/KACHU// was 41, 33, 34 days. Here, the fact that the weather conditions were warm and favorable during the plant growth period in 2020, despite the fact that the germination phase was in the early periods, the heading-ripening period was extended, and the weather conditions in 2021 and 2022 were relatively dry and hot, despite the late germination phase. it became known that the phases were shortened.

In 2022, the day of earing in lines #-4 KAUZ//ALTAR 84/AOS 3/KAUZ/3/CATBIRD10/4/MILAN/-DUCULA, #-15 ATTILA*2/RAYON/ /CATBIRD-1, #-16 Erythrospermum-2020 Compared to the Tezpishar variety, it happened 5-10 days earlier, and it was observed that the heading-ripening period was earlier than the standard.

As a result of three-year studies, the growth period in varieties and lines was 130 days on average in Tezpishar variety and 118-136 days in lines.

In the 26TH SAWYT nursery, the growth period in FRET2*/BRAMBLING//BECARD/3/WBLL1*-2/BRAMBLING-*2/4, BORL14*2//KFA/2KACHU lines is 130-131 days, and the pattern is equal to the variety and 4 of other lines. It turned out that it ripens 6 days later.

In NADI//TRCH/-HUIRIVIS#1/3/NADI and KINGBIRD#1//INQALAB 91*2/TUKURU/3/-BECARD/FRNCLN in 39TH ESWYT, the growing period differed by 3-4 days earlier, CWANA 18th SBWON - The growth period on the lines in the HT-2017/2018 nursery was shorter by 8 days compared to the Tezpishar variety.

In the Erythrospermum-2020 line, this indicator was on average 118 days, and the sample was separated from the variety 12 days earlier (Table 1).

During the research, samples of early-early varieties with high yield compared to the model variety were selected and selected for use as a starting source for valuable economic traits and characteristics.

The growing period in the nursery of the competitive variety trial. In the Tezpishar variety, the heading-ripening period was 36 days, the average heading-ripening period was 35 days, and the growing period was 128 days.

It was observed that PSI-2020/6 118 days, KP-2020/43, Nushkent varieties had a total growth period of 118 days, and others variety samples and lines had 133-140 days. The average heading-ripening period was 35 days in the sample, 31-32 days in varieties such as PSI-2020/9, KP-2016/58 KSI-2020/14kp-2016/88), KSI2020/20sp2016/303.

The relatively short heading-ripening period in these varieties can be explained by forced reduction due to heat and drought. In varieties KP-2016/58, KSI2020/20sp2016/303, it was found that the earing-ripening period lasted 35 days, 34 days, 34 days and 31 days, 31 days, 31 days, respectively, according to years in different weather conditions (Table 2).

Table 1.
SIMMYT and ICARDA Centers assessment of bread wheat lines on early maturity (Gallaaral, 2020-2022).

№	Plot #	Varieties and lines	2020		2021		2022		Average	
			heading-ripening, days	germination-ripening, days	heading-ripening, days	germination-ripening, days	heading-ripening, days	germination-ripening, days	heading-ripening, days	germination-ripening, days
26TH SEMI-ARID WHEAT YEALD TRIAL (26TH SAWYT)-2020										
1	301	**TEZPISHAR (local check)**	**36**	**151**	**36**	**122**	**35**	**117**	**36**	130
2	390	KUKBULOK (local check)	37	159	37	127	34	121	36	136
3	305	WHEAR/KUKUNA/3/C80.1/3*BATAVIA//2*WBLL1/4/QUAIU/5	35	160	36	128	34	115	35	134
4	322	KACHU/BECARD//WBLL1*2/BRAMBLING/3/KACHU/KINDE	38	162	37	127	35	118	37	136
5	347	FRET2*/BRAMBLING//BECARD/3/WBLL1*2/BRAMBLING*2/4	**40**	158	32	**120**	33	113	**35**	**130**
6	361	BORL14*2//KFA/2KACHU	**39**	157	33	**122**	34	113	**35**	**131**
39TH ELITE SELECTION WHEAT YEALD TRIAL (39TH ESWYT)-2020										
7	118	NADI//TRCH/HUIRIVIS#1/3/NADI	35	151	33	117	33	111	34	126
8	123	KACHU#1/3/T.DICOCCON PI94624/AE.SQUARROSA (409)//BCN	35	153	34	120	34	113	34	129
9	130	KINGBIRD#1//INQALAB 91*2/TUKURU/3/BECARD/FRNCLN	37	154	33	117	**32**	111	34	127
10	131	SUP152/BAJ#1/3/KACHU//WBLL1*2/BRAMBLING	38	158	34	120	32	114	35	131
11	148	STLN/MUNAL#1//2*BORL14	37	155	34	120	34	112	35	129
12	150	FRET2*2/BRAMBLING//BECARD/3/WBLL1*2/BRAMBLING*2/4	38	156	33	117	34	113	35	129
13	151	KACHU//WBLL1*2/BRAMBLING/3/BAJ#1/AKURI/4/KACHU//	41	158	33	117	34	113	36	129
CWANA 18th SBWON-HT-2017/2018										
14	35	KAUZ//ALTAR 84/AOS 3/KAUZ/3/CATBIRD-10/4/MILAN/DUCULA	35	145	35	117	34	114	35	125
15	38	ATTILA*2/RAYON//CATBIRD-1	34	142	33	113	33	110	33	122
16		Eritrospermum-2020	34	139	33	109	33	107	33	118

Table 2.

The growth period of varieties, samples and lines in the RNS nursery (Yield trial) (Gallaorol, 2020-2022)

№	Varieties and lines	Types	2020 (germination 05.01.2020.)			2021 й. (germination 15.02.2021.)			2022 й. (germination 10.02.2022.)			Average, days
			heading, day, month	ripening, day, month	heading-ripening, emergence-ripening, days	heading, day, month	ripening, day, month	heading-ripening, emergence-ripening, days	heading, day, month	ripening, day, month	heading-ripening, emergence-ripening, days	
1	Tezpishar (st)	*Erythros.*	**30.04.**	**05.06.**	**36/150**	**10.05.**	**14.06.**	**35/119**	**03.05.**	**06.06.**	**34/116**	**35/128**
2	Noshkent	*Erythros.*	03.05.	03.06.	33/**148**	12.05.	16.06.	35/**121**	07.05.	06.06.	30/**116**	**33/128**
3	Kizildon	*Erythros.*	04.05.	07.06.	35/**152**	12.05.	16.06.	35/**123**	10.05.	12.06.	33/**122**	**34/132**
4	Sanzar-6	*Erythros.*	05.05.	08.06.	34/**153**	14.05.	17.06.	34/**123**	10.05	12.06.	33/**122**	**34/133**
5	Istiklol-6	*Erythros.*	11.05.	14.06.	34/**159**	17.05.	19.06.	33/**125**	12.06.	14.06.	33/**124**	**33/136**
6	Sogdiana	***Greacum***	10.05.	11.06.	32/**156**	15.05.	18.06.	34/**124**	11.05.	14.06.	34/**124**	**33/135**
7	Bakxmal-97	*Erythros.*	12.05.	18.06.	37/**156**	18.05.	20.06.	33/**126**	13.05.	15.06.	33/**125**	**34/136**
8	PSI-2020/6	*Erythros.*	07.05.	09.06.	33/**154**	13.05.	17.06.	35/**123**	10.05.	08.06.	29/**118**	**32/132**
9	PSI-2020/8	*Erythros.*	07.05.	09.06.	33/**154**	16.05.	18.06.	33/**124**	10.05.	12.06.	33/**122**	**33/133**
10	KP-2020/38	*Erythros.*	11.05.	16.06.	36/**161**	15.05.	18.06.	34/**124**	14.05.	16.06.	33/**126**	**34/137**
11	PSI-2020/9	*Erythros.*	-	-	-	11.05.	16.06.	36/**122**	10.05.	10.06.	31/**120**	***33/121***
12	ICARDA2020/35	*Lutescens*	-	-	-	10.05.	14.06.	35/**119**	04.05.	08.06.	35/**118**	***35/119***
13	KP-2020/43	*Erythros.*	-	-	-	10.05.	14.05.	35/**119**	06.05.	06.06.	31/**116**	***31/118***
14	KP-2016/58	*Erythros.*	10.05.	14.06.	35/**159**	17.05.	20.06.	34/**126**	14.05.	17.06.	34/**127**	**34/136**
15	KSI-2020/14kp-2016/88)	***Greacum***	15.05.	19.06.	35/**164**	22.05.	23.05.	32/**129**	18.05.	16.06.	29/**126**	**32/140**
16	KSI2020/20sp2016/303	***Greacum***	15.05.	15.06.	31/**160**	18.05.	20.06.	31/**126**	16.05.	16.06.	31/**126**	**31/138**
17	KP-2020/26	*Lutescens*	-	-	-	19.05.	23.06.	34/**129**	14.05.	13.06.	30/**123**	***32/126***
18	01/2020	*Erythros.*	-	-	-	-	-	-	14.05.	13.06.	30/**123**	***30/123***

CONCLUSIONS. Frequent drought conditions in rainfed regions where wheat is grown in Uzbekistan have a negative effect on the grain yield of bread wheat.

The use of early, short-maturing bread wheat cultivars and lines as starting sources in selection processes is the main factor in creating new varieties resistant to drought and high temperature in dry areas.

The results of this research are used for the creation of new early varieties of bread wheat for planting in Central Asia, including the dry regions of Uzbekistan, to *Greacum* (early spiked, hairless, spike and grain color white) and *Lutescens* (earless, spike color white, grain color red) species compared to *Erythrospermum* (early spiked, white spike and red grain) shows that the use of bread wheat cultivars and lines as starting sources is effective.

The short duration of the heading-ripening period does not determine the precocity of the variety, but it can be concluded that the same stability of this period in different weather conditions over the years is one of the characteristics that determine the resistance of the variety to heat and drought.

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