BIOLOGICAL AND ECONOMIC CHARACTERISTICS OF DURUM WHEAT NEW VARIETY "ISTIKLOL-25"

Khodjaeva N.J., Ravshanov K.,
Sayidkhanov T., Dzhorakulov K., Saidkhanov M.

Annotasiya. Mazkur maqolada universitet xodimlari tomonidan chiqarilgan, mahaliy qatiq bug'doyning Istiqlol navining ayrim biologik va xo'jalik xususiyatlariga, jumladan ekish va o'g'it meyorlarining rivojlanish fazalarining davomiyligiga tasiri, urug'larning unuvchanligi, ekish va o'g'it meyorining kuzgi bug'doy hosil tarkibiga bog'likligi, kuzgi bug'doy navlarining qishga chidamliligi va quruq modda hosil qilishiga ekish va o'g'itlar meyorining tasiri ko'rsatkichlari o'rganilib, xulosalar chiqarilgan.

Kalit so'zlar: Qattiq bug'doy, Istiqlol, don unuvchanligi, ekish ma'yorlari va muddatlari, qand miqdori

Аннотасия. В данной стате рассмотрены некоторые биологические и хозяйственные характеристики сорта Истиклял местной твердой пшенисы, выведенной сотрудниками университета, в том числе выявлены показатели влияние нормы и сроков посева на продолжителност фаз развития, всхожест семян. Изучены состав урожая пшенисы, зимостойкост и влияние нормы и сроков посева на образование сухого вещества и сделаны соотвецтвующие выводы.

Ключевые слова: Твердая пшениса, Истиклял, всхожест зерна, нормы и сроки посева, сахаристост

Абстракт. В данной стате рассмотренй некоторе биологические и ҳозйственне чарактеристики сорта Истиклял местной твердой шеницй, вйведенной сотрудниками университета, в том числе вйявленй покасетели влияние нормии и сроков посева на должителност пҳасе развития, вшожест семян. Изученй состав урожая пшеницй, зимостойкост и влияние нормй и сроков посева на образование суҳого вешчества и сделанй соотвецтвуюшчие вйводй.

Key words: Tverdaya pshenitsa, Istiklyal, vshojest zerna, normy i sroki poseva, sacharistost

In our republic, in the following years, irrigated fields from spiked grain crops will provide the population with grain products. An important factor in achieving a high and high-quality grain harvest is the fact that the regions are located based on soil and climate conditions, special attention is paid to seed production, timely and high-quality agrotechnical activities, and the effective use of modern technologies and methods of irrigation. In this regard, the works in this regard will serve to increase the income of the farmers and the rural population through the efficient use of water in irrigation, the development of water-saving irrigation regimes taking into account the soil and climatic conditions for each type of crop, the improvement of land reclamation, and the effective organization of water supply.

The adoption of the specified decrees is not accidental. Because the water resources of our Republic are limited in drought conditions, economical and efficient use of existing water reserves remains one of the most important current issues. Due to the reforms implemented in agriculture, the type of crops, the structure of their placement will change dramatically, which will have an active influence on the mode and balance of water use in irrigation systems. This, in turn, requires proper classification of the irrigation regime of cultivated crops.

Increasing grain production is an important factor in strengthening the economy of our country and providing the people with food products. Experiences of world practice show that each country can be fully independent politically and economically only if it is able to provide its population with the main types of food products grown on its own.

Taking into account the above, a number of scientists of our institute created a new variety - Istiqlal-25 variety (1).

Istiklal-25 variety is double, prismatic spike, medium length. The spike is medium in length, ovate, weakly veined tooth is straight, shoulder is wide, suture is clear, the tips are black color longer than the spike. The grain is large, white, medium-sized, oval-oblong, growing period 198-204 days. The average weight of 1000 grains is 50.0-55.0 g, the quality of pasta is good.

Research object and methods. In the conditions of Samarkand region, a number of experiments were conducted in order to study the biological properties of the promising variety "Istiqlol 25", which has passed the state register of intensive type durum wheat, under irrigated conditions.

In order to determine the biological characteristics of durum wheat, determine the optimal terms and standards of planting, and study their interdependence, field experiments were conducted in the irrigated lands of the private scientific production farm "Oqdarya" in the Okdarya district of Samarkand region.

Soils in the territory of Akdarya district of Samarkand region are mainly meadow-gray soil, medium sand according to mechanical composition, the depth of seepage water is 4-5 m, and in places close to the riverbed it is 2-3 m. Due to the decrease of organic substances in the soil, the amount of humus has decreased to less than 1%. This is due to the lack of crop rotation and the lack of or little use of organic fertilizers. The experimental sites are irrigated fields that have been planted with cotton for many years.

Our experiments were carried out according to the manuals and methods of the recommendations of the Ministry of Agriculture and Aquaculture of the Republic, Science and Production Center, scientific and research institutes, the State Variety Testing Center, the State Seed Control Center of the Republic.

Ammonium nitrate (34% N), phosphoric fertilizers ammophos (11% N, 46% P_2O_5) and potassium salt (54% K_2O) were used in the experiment. In the experiments, soil moisture was maintained at not less than 70% of limited moisture capacity (ChDNS). Before planting, irrigation was carried out at the rate of 800m³ per hectare. Phosphorous and potash fertilizers were applied to the ground 100%

according to the experimental method before plowing. The rate of nitrogen fertilizers was divided into two during the budding and tuberting phases of the plant.

Planting was carried out at the expense of 3.0, 4.5, 6.0 million fertile seeds. Watering was carried out immediately after planting. Irrigation rates were determined based on soil moisture deficit (deficit).

All technological methods, except for the methods studied in the experiment, were carried out on the basis of general agrotechnics adopted by the region.

Analysis of results. Istiklal - 25 varieties were included in the state register in 2022, the yield on irrigated land is on average 55-60 t/ha. The amount of protein in grain is 14.5-16.0%, gluten is 34.0-36.0%. The variety is resistant to diseases, pests and lodging. Medium-sized, winters well, drought-resistant. The height of the plant is 95-100 cm. Productivity is 55-60 tons/ha. Important technological methods that significantly affect winter wheat yield and grain quality include planting and fertilizer rates [2,3].

Optimizing planting and fertilizer standards for obtaining a high-quality and high yield of winter wheat in irrigated lands, creating crops that can effectively use external environmental factors to form seeds that meet the requirements of class I, creating an optimal number of productive stems in a certain unit area, managing the resulting agrocinosis things like that are done. Since the technology of growing seed winter wheat is different from the technology of growing goods, the optimization of planting and fertilizer rates is of great theoretical and practical importance.

The duration of sowing, germination, development phases of winter wheat seeds varies depending on many factors, temperature, moisture, light, supply of nutrients, biological characteristics of the variety, and agrotechnical measures.

In the years of our experiment, the development phases and duration of the growing season were significantly affected by planting and fertilizer rates (Table 1).

The germination period of winter wheat seeds was not affected by planting and fertilizer rates. All planting options were planted at the same time on October 27, the average seed germination period was 11 days.

Table 1

Effect of planting and fertilizer rates on duration of development phases, days

Planting standards mln. seed	Fertilizer rate is kg/ha	Planting - sprouting	Germination-accumulation	Clumping-tubing	Tubing-heading	Spike-flowering	Flowering-milking	Milk ripening-wax ripening	Wax ripening - full ripening	Growth period

3,0	1	11	17	140	30	5	7	10	10	232
	2	11	17	141	34	6	8	12	11	235
	3	11	17	142	35	6	8	13	11	237
	4	11	17	143	37	7	8	13	12	239
	5	11	17	144	39	6	8	13	12	243
4,5	1	11	17	139	32	6	8	12	12	231
	2	11	17	140	32	6	9	12	13	236
	3	11	17	141	34	6	9	13	13	239
	4	11	17	142	37	7	9	14	13	240
	5	11	17	143	39	7	10	14	13	243
6,0	1	11	17	139	32	6	8	12	12	232
	2	11	17	140	33	6	8	12	13	236
	3	11	17	141	36	6	9	13	13	237
	4	11	17	142	37	6	9	14	14	240
	5	11	17	142	39	6	9	14	14	243

In our experiment, the period of germination did not change depending on the planting and fertilizer rates, on average it was 12 days in all options.

Winter and spring are considered the period from the heading phase to the tuber phase of winter wheat.

The beginning and duration of the phase during the period of budding and sprouting was affected by changes in planting and fertilizer standards. The longest budding-shooting period is 142 days in the case of planting criteria of 3.0 million viable seeds, fertilizer criteria of NPK 210:158:105 kg/ha. During this period, it was longer compared to the periods of other phases, as the period of accumulation and winter dormancy of plants also entered. The minimum germination-germination period was 6.0 million viable seeds/ha, 138 days in the control option without fertilizer. An increase in sowing rates and a decrease in the length of the flowering-shooting period were observed in both varieties.

The tuber-earing period varied from 37 to 41 days, depending on planting and fertilizer rates. The effect of sowing and fertilizer rates on the onset of phases and their duration during the spike period was observed. Planting rate is 3.0 to 6.0 million. with the increase of the seed/ha, an average 3-4 days earlier start was observed with the increase of the sowing rate. The shortest tuber-spike period is 6.0 million years. it was observed that 26 days were observed in the control variant without fertilizer.

The periods of earing-flowering, flowering-milk ripening, milk ripening-wax ripening, wax ripening-full ripening also varied from 6 to 11 days in all variants.

The longest growing period was observed in the variant where the standard of planting 4.5 million seeds/ha NPK 210:158:105 kg/ha was used, that is, it was 246 days.

It was observed that the growth period varied from 232 to 244 days depending on the planting and fertilizer rates.

In the experiment, it was also observed that the change of the growth period with increasing the rate of fertilizer increased by an average of 10-12 days compared to the control (without fertilizer) option.

Planting standard is 3.0 mln. from 6.0 million seeds/ha. increasing the seed/g shortening of the growth period by 3-4 days was observed, that is, full ripening was determined 3-4 days earlier.

The size of the spikes is greatly influenced by the ratio of mineral nutrients. During the flowering period, if nitrogen is a priority in nutrition, the elongation of the growth cone is prolonged for several days, and many spikes are formed in the spike. If phosphorus is the priority, spike formation is accelerated and spikes are less formed in the spike. Therefore, nutrients should be added to the soil in the right proportions.

It can be seen from the data of our experiments that the standard of planting was 3.0 million viable seeds, the length of the spike in the control version without fertilizer was 6.2 cm, the number of spikes in the spike was 12.6, the number of grains in the spike was 38, and the mass of grain in one spike was 1.19 g (Table 1).

Compared to the control option (without fertilizer) with 3.0 million viable seeds/ha and 3.0 million viable seeds/ha and N210:P158:K105, the spike length was 3.9 cm, the number of spikes in the spike was up to 7.4, and the number of grains in the spike was 10 per grain, the grain mass in one spike increased to 1.02 g.

The spike length, the number of spikes in the spike, the number of grains in the spike, and the mass of grain in one spike were observed to decrease compared to the spikes applied with 3.0 and 4.5 million germinated seeds. The reason for this was expressed by the large number of seedlings and the lack of feed area.

Table 2

Dependence of planting and fertilizer rate on winter wheat yield

Sowing rate is million seeds/ha	Fertilizer norm NPK kg/ha	Spike length, cm	The number of spikes on the spike, pcs	The number of grains in a spike, pcs	Grain mass in 1 ear/ gr
3,0	Control (no fertilizer)	6,2	12,6	38	1,19
	NPK 120:90:60	8,6	16,8	42	1,55
	NPK 150:113:75	9,1	18,5	44	1,72
	NPK 180:135:90	9,4	19,6	46	1,89
	NPK 210:158:105	10,1	20,0	48	2,21
4,5	Control (no fertilizer)	6,4	12,8	36	1,22
	NPK 120:90:60	8,5	16,0	40	1,64
	NPK 150:113:75	9,0	17,8	42	1,81
	NPK 180:135:90	9,3	18,7	44	2,19
	NPK 210:158:105	9,4	19,0	46	2,11

6,0	Control (no fertilizer)	6,1	11,7	34	1,11
	NPK 120:90:60	8,3	15,4	37	1,56
	NPK 150:113:75	8,6	16,1	39	1,83
	NPK 180:135:90	8,9	17,3	41	2,10
	NPK 210:158:105	9,0	17,8	36	1,47

The best performance was observed in the application of 3.0 million germinated seeds/ha and N210:P158:K105, spike length 10.1 cm, number of spikes in spike 20.0, number of grains in spike 48, mass of grain in one spike 2.21 g organized.

Productivity is the level of productivity of a certain plant species, variety and hybrid. Under the same conditions, the yield of different varieties is different.

The yield of winter wheat depends on the biological characteristics of the variety, soil climatic conditions, water, light, feeding regime and applied agro-measures. In the cultivation of winter wheat, the external environmental factor or the applied agrotechnology has a strong influence on the yield or grain quality. It is possible to grow high-quality grain when the technology of cultivation suitable for the biological characteristics of varieties is used. The used cultivation technology is required to optimally satisfy the demand for vital factors of winter wheat in the stages of orinogenesis.

Important technological methods that significantly affect winter wheat yield and grain quality include planting and fertilizer rates. If the plants are sparse in the area planted with winter wheat, the productivity of each individual plant may be high. With an increase in the thickness of the bush, the productivity of individual plants decreases, but the productivity increases to a certain extent. In this case, the number of plants in a given unit area is optimized, the yield is the highest, and then the yield slowly decreases. Correct application of fertilizer rate will ensure good grain quality and seed quality in addition to increasing yield.

Our experimental results show that the highest yield of 76.2 t/ha or 43.0 kg/ha of fertilizer compared to the control (without fertilizer) in the plots with the planting rate of 4.5 million viable seeds/ha and the fertilizer rate of NPK 180:135:90 kg/ha. 8 ts/ha, 9.4 ts/ha additional yield was obtained over the sowing standard, the lowest yield was 3.0 million viable seeds/ha and 57.1 ts/ha when applying fertilizer standard NPK 120:135:90 kg/ha or control without fertilizer 28.2 t/ha additional yield was obtained due to fertilizer compared to the variant (Table 2).

The planting rate of 3.0 million viable seeds was higher in the plots where one plant was established, the harvest was obtained from later grown stalks, the spikes and seeds were small in these stalks, which led to a decrease in yield.

Table 3

Effect of planting and fertilizer rates on grain yield of winter wheat varieties

Sowing rate is million seeds/ha	Fertilizer norm NPK kg/ha	Average productivity ts/ha	additional crop, ts/ha	
			From planting criteria	Fertilizer from the norm
3,0	Control (no fertilizer)	28,9	-	-
	NPK 120:90:60	57,1	-	28,2
	NPK 150:113:75	64,4	-	35,5
	NPK 180:135:90	66,8	-	37,9
	NPK 210:158:105	67,2	-	38,3
4,5	Control (no fertilizer)	32,4	3,5	-
	NPK 120:90:60	64,7	7,6	32,3
	NPK 150:113:75	73,0	8,6	40,6
	NPK 180:135:90	76,2	9,4	43,8
	NPK 210:158:105	74,4	7,2	42,0
6,0	Control (no fertilizer)	33,1	4,2	-
	NPK 120:90:60	66,0	8,9	32,9
	NPK 150:113:75	72,7	8,3	39,6
	NPK 180:135:90	71,2	4,4	38,1
	NPK 210:158:105	68,8	1,6	35,7

According to the results of the experiment, increasing the rate of planting and fertilizer led to a decrease in yield. 6.0 million viable seeds/ha and the fertilizer standard NPK 210:158:105 kg/ha yielded 68.8 t/ha or 35.7 t/ha compared to the control option without fertilizer, 1.6 t/ha of the planting standard yield was obtained.

Experience shows that as a result of the increase in planting and fertilizer rates, the number of seedlings increased, and the stems of the plants became taller and shallower, and the plants became partially dormant. Due to the lack of air circulation due to the thickness of the plants, the incidence rate increased.

Protein is the main indicator of the quality of wheat grain. Protein content is the main factor in classifying wheat into classes.

Grain protein content affects energy and nutritional quality for both the food industry and the feed industry.

There is a direct relationship between yield per unit area and protein content of spiked grains. To maintain high protein content, farmers need to predict the yield and use fertilizers correctly.

The amount of gluten in wheat is affected by the variety, growing conditions, proper harvesting and storage, as well as the chemical fertilizers and herbicides

used. Diseases, pests, unfavorable growth conditions have a negative effect on the gluten content. A decrease in the indicator is characteristic of improper drying of grain. The amount of gluten in it affects the protein value and organoleptic properties of the product. The quality of gluten determines the physical properties of the grain. For example, the elasticity of the dough. Gluten flour with low elasticity is not suitable for creating shaped products (for example, tubes or pasta), because the products do not retain their original appearance when boiled.

In our experiments, we determined grain quality indicators of wheat planted in irrigated fields (Table 4).

Table 4

Grain quality indicators of durum wheat variety "Istiklol-25".

Grain moisture,%	Protein content, %	Raw gluten	
		amount,%	elasticity, cm
13.2	16.6	28.5	25.5

The moisture index is important in the vital activity of the grain mass, dry grain almost does not breathe, and with an increase in moisture, metabolism in it is activated. When grain moisture reaches 15%-16%, its respiration intensity increases sharply. According to GOST, the moisture content of grain during storage is 13.5-15%.

According to the indicators presented in the table, we believe that in our experiments, grain moisture of durum wheat "Istiqlol-25" variety is 13.2%, protein content and raw gluten indicators meet the requirements.

Conclusion. Thus, in the conditions of the Zarafshan Valley, in the conditions of the irrigated lands of winter wheat intensive type of hard wheat "Istiqlol-25" for obtaining high yield and quality seeds, the sowing rate is 4.5 million fertile seeds/ha and the fertilizer rate is NPK 180:135:90 kg/ha. along with its positive effect, it ensures the achievement of high economic profitability in grain farming.

References

1. Kabilov I., Omonov A., Otaboev G'. and others. Technology of cultivation of cereals. - Tashkent: 2000. - 21 p.
2. Ravshanov K., Khodjaeva N., Ruzikulova Z. Features of water exchange of some varieties of durum wheat under different conditions of water supply // Modern technologies: topical issues, achievements and innovations. - 2017. - S. 61-64.
3. Khodjayeva, N., et al. "Influence of some agro-technical measures on the yield of wheat of local variety" Istiklol 25" native to Uzbekistan." *IOP Conference Series: Earth and Environmental Science*. Vol. 1068. No. 1. 2022.
4. Khodjaeva N. D., Ruzikulova Z. U., Dzhurakulov K. Kh. Water exchange of some local durum wheat varieties. II International Scientific and Practical Internet Conference, March 3-4, 2021 – Dnipro, Ukraine, 2021.–513 p. - S. 463.

5. Khodzhaeva, N. D., Urazbayev, I. U., & Ishankulova, K. K. (2021, December). Study on some features of water exchange of local varieties of hard wheat. In *IOP Conference Series: Earth and Environmental Science* (Vol. 939, No. 1, p. 012061). IOP Publishing.
6. Khalilov N., Uzokov G. Effect of using modern agrotechnologies in grain planting. J. "AGRO ILM" No. 4 (48), 2017.-B.30