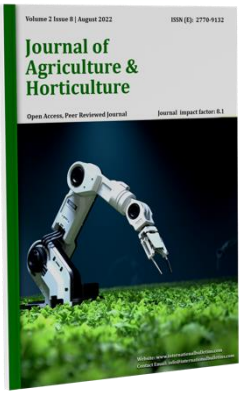

RESULTS OF A COMPARATIVE TESTING OF THE NEWLY DEVELOPED POTATO VARIETY "TASHKENT ERTAGISI" IN THE SELECTION-NURSERY DURING SUCCESSION PERIOD

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https://doi.org/10.5281/zenodo.15209021

Abstract: This article presents the results of comparative testing of the newly developed potato variety "Tashkent Ertagisi" against the standard "Sante" variety in the selection-nursery plot during the succession growing period.

According to the research results, the newly developed potato variety "Tashkent Ertagisi" manifested a 9-10 day earlier germination and flowering compared to the standard "Sante" variety. Additionally, it showed a 13-16% increase in stem number and height, as well as a 17.5% higher yield.

Key words: selection-nursery plot, variety, "Tashkent Ertagisi", "Sante", coefficient of variation, correlation coefficient, budding, flowering, stem height, number of stems, leaf surface, yield.

Introduction. The main tasks in developing potato cultivation in our republic today include increasing potato production, enhancing yield, improving the seed production system, and ensuring that farmers, private household farms, and agricultural enterprises are supplied with healthy and high-quality seed material. Potatoes are one of the most important, widely grown, and strategically significant food, fodder, and industrial crops in global agriculture. Currently, potatoes are cultivated in more than 150 countries worldwide, covering 23.1 million hectares and producing a total yield of 438.9 million tons. The average yield is around 18-19 tons per hectare. In recent years, the potato cultivation area has increased by 4-5 million hectares, while total production has risen by 70-80 million tons.

Uzbekistan ranks 23rd among these countries. The largest potato-producing countries include China, India, Russia, Ukraine, the United States, Germany, Bangladesh, Poland, France, and the Netherlands [1;6;7;8].

Research conditions and methodology. The research was conducted in the experimental fields of the Tashkent Scientific-Experimental Station of the Research Institute of Vegetables, Melons, and Potato Crops during the years 2020-2021.

Field and production experiments, including planting, crop care, harvesting, calculation, and analysis, were carried out following generally accepted methodologies and the recommendations of the Ministry of Agriculture and Water Resources, the All-Russian Institute of Plant Industry, the All-Russian Research Institute of Potato Farming, the Research Institute of Vegetables, Melons, and Potato Crops, and the State Commission for Testing New Varieties of Agricultural Crops of the Republic of Uzbekistan.

The statistical analysis of the results obtained from field experiments was performed using the B.A. Dospekhov method with the help of Microsoft Excel software.

Research results and discussion. The newly developed potato variety "Tashkent Ertagisi" was studied by planting it during succession planting period on July 20 in the fields

of the Tashkent Scientific-Experimental Station of the Research Institute of Vegetables, Melons, and Potatoes.

A potato selection nursery is a specially designated plot for selecting and cultivating new potato varieties. It is used to study various potato varieties, their characteristics and traits, growth conditions, and yield potential. In such nurseries, researchers test effective cultivation methods, agronomic techniques, and new potato varieties to enhance productivity and sustainability.

The phenological observation results of the potato varieties “Sante” and “Tashkent Ertagisi,” which were planted in the selection-nursery during the succession planting period, are presented in Table 1.

Table-1

Phenological observation results of the potato varieties “Sante” and “Tashkent Ertagisi” planted in the selection nursery during the succession planting period (in 2020-2021)

Varietal samples	germination, day		From full germination to….., day			
			budding		flowering	
	10%	75%	10%	75%	10%	75%
Sante (st)	12,0	21,0	23,0	32,0	38,0	45,0
Tashkent Ertagisi	10,0	17,0	19,0	24,0	29,0	35,0
V%	11,0	23,0	27,0	32,0	26,0	37,0
V%	14,0	29,0	26,0	35,0	27,0	35,0

According to the research results, in the standard "Sante" variety, germination of seedling was observed at 10% in 12 days and 75% in 21 days, budding at 10% in 23 days and 75% in 32 days, and flowering at 10% in 38 days and 75% in 45 days. In contrast, the "Tashkent Ertagisi" variety showed earlier development, with germination 2-4 days, budding 4-8 days, and flowering 9-10 days earlier than the standard variety.

Research results also showed that in the “Sante” and “Tashkent Ertagisi” varieties planted during the succession planting period, the coefficient of variation for 10% seedling germination ranged between 11-14%, indicating strong fluctuations. When 75% of the seedlings had emerged, the variation coefficient ranged between 23-29%, also showing strong fluctuations. From full germination until 10-75% budding and flowering, the coefficient of variation remained high, ranging between 26-37%.

The biometric measurement results of the potato varieties “Sante” and “Tashkent Ertagisi” which were planted in the selection nursery during the succession planting period, are presented in Table 2.

Table-2

The biometric measurement results of the potato varieties “Sante” and “Tashkent Ertagisi” planted in the selection nursery during the succession planting period (in 2020-2021)

Varietal samples	At the full flowering stage				Plant height at the harvesting period		Infection of plant by diseases, %	
	Stem height		Stem number					
	cm	relative to st,%	piece	relative to st,%	cm	relative to st, %	Fusarium	Anthracnose
Santé (st)	49,3	100,0	3,1	100,0	54,8	100,0	5	7
Tashkent Ertagisi	55,8	113,2	3,6	116,1	6,1	118,8	3	4
r=	0,85±0,15							
r=	0,88±0,12							

When comparing the stem height and number of stems of the newly developed "Tashkent Ertagisi" variety, planted during the succession period, with the standard "Sante" variety, the following results were observed:

In the "Sante" variety, the stem height at full flowering was 49.3 cm (100%). In contrast, the "Tashkent Ertagisi" variety had a 13.2% greater stem height, a 16.1% higher number of stems, and at full harvest time, its stem height was 18.8% greater than that of the standard variety.

In the varieties planted during the succession planting period, the correlation between stem height and the number of stems at full flowering was r = 0.85 ± 0.15 in the standard "Sante" variety and r = 0.88 ± 0.12 in the "Tashkent Ertagisi" variety. In both cases, the correlation was strong.

The weight of stems per plant, number of leaves, and leaf surface area of potato varieties planted early in the selection nursery are presented in Table 3.

The stem weight per plant, number of leaves, and leaf surface area per plant and per hectare varied across different varieties.

Table-3

The weight of stems per plant, number of leaves, and leaf surface of potato varieties "Sante" and "Tashkent Ertagisi" planted in the selection nursery during the succession planting period

(in 2020-2021)

Varietal samples	Per plant						Leaf surface of the plant per ha, thousand m^2
	Stem weight		Number of leaves		Leaf surface		
	g	Relative to st, %	piece	Relative to st, %	dm^2	Relative to st, %	
"Sante"(st)	333	100,0	330	100,0	45,4	100,0	25,3
"Tashkent Ertagisi"	380	114,1	390	118,2	52,8	116,3	31,3

In the standard "Sante" variety, the stem weight was 333.0 g. Compared to this, in the "Tashkent Ertagisi" variety, the stem weight was 14.1% higher, the number of leaves increased by 18.2%, and the leaf surface area was 16.3% larger, as confirmed by the experiments.

The yield results of the newly developed potato varieties planted in the selection nursery during the succession planting period are presented in Table 4.

Table-4

The yield results of the newly developed potato varieties planted in the selection nursery during the succession planting period

(in 2020-2021)

Varietal samples	Harvesting time, day			Yield per plant, g	Yield, t/ha	Relative to standard,%
	60	70	80			
	Mean weight of tuber per plant, g					
"Sante" (st)	93	135	164	392	22,3	100,0
"Tashkent Ertagisi"	112	155	193	460	26,2	117,5
LSD $_{05}$					3,1	
Sx,%					4,2	

During the succession planting period, the harvest timing of the newly developed "Tashkent Ertagisi" variety was compared with the standard "Sante" variety. Based on the dynamic harvesting results at 60, 70, and 80 days, it was observed that the tuber weight per plant in "Tashkent Ertagisi" increased by 68 grams more compared to the standard variety.

Figure. Experimental plot of "Sante" and "Tashkent Ertagisi" potato varieties planted in selection nursery during succession planting period.

If the yield of the standard variety "Sante" was 22.3 tons per hectare, the "Tashkent Ertagisi" variety showed a yield of 26.2 tons, which is 17.5% higher than the standard variety. The least significant difference among all variants was determined, with the LSD_{05} indicator at 3.1 t/ha and the experimental accuracy S_x,% at 4.2%.

CONCLUSION

1. In the standard "Sante" variety, the germination of 10-75% of seedlings was observed within 12-21 days, the 10-75% budding occurred within 23-32 days, and the 10-75% flowering was recorded within 38-45 days. In the "Tashkent Ertagisi" variety, the germination of 10-75% of seedlings was found to be 2-4 days earlier, budding 4-8 days earlier, and flowering 9-10 days earlier compared to the standard variety.

2. The stem height of the "Sante" potato variety, planted during succession planting period, reached 49.3 cm, accounting for 100% during the full flowering stage. In the "Tashkent Ertagisi" variety, this indicator was 13.2% higher than the standard variety, the number of stems was 16.1% more, and the stem height was 18.8% higher.

3. In the varieties planted during the succession planting period, at the full flowering stage, the correlation between stem height and the number of stems was $r = 0.85 \pm 0.15$ in the standard "Sante" variety and $r = 0.88 \pm 0.12$ in the "Tashkent Ertagisi" variety. In both varieties, the correlation was found to be strong.

The yield of the standard "Sante" variety was 22.3 t/ha. In comparison, the yield of the "Tashkent Ertagisi" variety reached 26.2 t/ha, which was 17.5% higher than the standard variety. The difference within the least significant difference (LSD) among all variants was determined, with the LSD_{05} value at 3.1 t/ha and the experimental accuracy (S_x,%) at 4.2%.

References:

1.Avdienko V.G., Avdienko O.V., Lobachev D.A., Zaitsev A.V. How to Rapidly Propagate Good Potato Varieties // Journal Potatoes and Vegetables. – Moscow: 2010. – No. 6. – Pp. 26-27.
2.Dospekhov B.A. Methodology of Field Experiments with Fundamentals of Statistical Data Processing. – Moscow: Alliance, 2011. – p.351.
3.Litvinov S.S. Methodology of Field Experiments in Vegetable Growing. – Moscow: GNU VNIIO, 2011. – p.648.

4. Methodology for State Variety Testing of Agricultural Crops. Issue 1. General Part. – Moscow, 2019. – p.329.
5. R.A. Nizomov et al. Methods for Conducting Experiments on Vegetable, Melon, and Potato Crops. – Tashkent, 2023. – Pp. 204-217.
6. Ostonakulov T.E., Amanturdiev I.Kh., Ismoilov A.I. Yield and Multiplication Coefficient of Potato Varieties Planted in Different Planting Schemes// Proceedings of the International Scientific and Technical Conference. – Andijan, 2023. – Pp. 403-406.
7. Ostonakulov T.E. Potato Growing. Textbook. – Tashkent, 2023. – p.265.
8. Ostonakulov T.E., Makhamatova M.M. General Selection and Seed Production. Study Guide. – Tashkent, 2024. – p.304.