



AGRONOMIC CHARACTERISTICS OF ONION VARIANTS SELECTED BASED ON COMPLEX TRAITS

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Abstract *In the soil and climatic conditions of the Republic of Karakalpakstan, the acclimatization and study of economically valuable traits of more than 32 collections of onions imported from foreign countries, as well as the selection of 12 varietal samples from the onion collection based on complex traits, were carried out according to economically valuable traits, i.e., early maturity, yield, and quality yield.*

Keywords: *complex characteristics, variety, line, variety, hybrid, bulb, yield, early-ripening, variety samples, leaf, leaf surface area, bulb weight.*

Introduction. Many leading onion-producing countries worldwide are conducting extensive scientific research to increase yields, improve product quality and shelf life, as well as supply fresh onion products to the market during specific seasons. In this direction, the development of early-ripening, high-yielding, high-quality, and long-storing onion varieties and hybrids is helping to meet the demand for bulb onions. Currently, in the Republic of Uzbekistan, onions are primarily grown from seeds in two seasons. However, varieties adapted to various climatic and environmental conditions have not been sufficiently developed. Therefore, from a national economic perspective, one of the important and urgent tasks is to provide

the population with fresh onion products throughout the year by creating new varieties suitable for the soil and climatic conditions of the country. [1]; [2]; [3].

Experimental setup and methods. Variety samples of the onion collection were tested by sowing seeds early in 2017-2018. In the study of varietal samples, 31 varietal samples of onions imported from abroad were tested, and 12 varietal samples were tested for early maturity, yield, and marketability, i.e., complex traits. Field experiments were conducted in 2 replications on an area of 7 m², and the Kaba-132 variety was used as a standard. [4]; [5].

Results of the experiment. From the main onion collection, 12 varietal samples were selected based on economically valuable traits, i.e., early maturity, yield, and quality yield. In particular, for early maturity, varieties k-40 "Roket," k-43 "Spring Onion," k-50 "Super Bear," k-75 "Prince-33," k-85 "K-3" and k-80 "K-13" were selected, for yield, varieties k-145 "Nameless," k-156 "Nameless," k-164 "Nameless," k-85 "K-3" and k-88 "Nameless," for commercial value, varieties k-205 "Nameless," k-40 "Roket," k-43 "Spring Onion," k-50 "Super Bear," k-75 "Prince-33," k-85 "K-3," k-80 "K-13" and k-95 "Nameless" were selected.

It was established that the varietal samples of onions tested in the experiments differ from each other in the number of leaves collected on one plant and their size. In this case, the varieties k-58 "Kaba-132, St," k-1 "Dermo," k-9 "Brown Beauty," k-194 "Nameless," k-196 "Nameless," k-10 "Kind Variety," k-12 "Pioneer 25013," k-13 "Canada Maple," k-173 "Nameless," k-185 "Nameless," k-11 "Halsedon," k-18 "Meteor," k-145 "Nameless," k-151 "Nameless," k-43 "Spring Onion," k-44 "Grandina," k-170 "Nameless," k-120 "Nameless," k-50 "Super Bear," k-153 "Red Onion," k-128 "Red Sak," k-85 "K-3," k-81 "K-11," k-83 "K-12," k-80 "K-13," k-95 "Nameless," k-88 "Nameless" (5-12 pieces) had the lowest number of leaves compared to the varieties k-205 "

In the collection variety samples k-205 "Nameless," k-40 "Roket," k-156 "Nameless," k-164 "Nameless," and k-75 "Prince-33," the number of leaves per plant

averaged 14-18 pieces, while in the standard variety k-58 "Kaba-132, St" this indicator was 12 pieces, which is 2-6 pieces or 16.6-50% more than in the standard. According to the complex traits of the world collection of onions, the following onion accessions selected for the longest leaves in single plants — k-k-1 "Dermo", k-9 "Brown Beauty", k-194 "Nameless", k-196 "Nameless", k-10 "Kind Variety", k-12 "Pioneer 25013", k-13 "Canade Maple", k-205 "Nameless", k-173 "Nameless", k-185 "Nameless", k-11 "Chalcedon", k-18 "Meteor", k-145 "Nameless", k-151 "Nameless", k-40 "Rocket", k-43 "Spring Onion", k-44 "Grandina", k-156 "Nameless", k-164 "Nameless", k-170 "Nameless", k-120 "Nameless", k-50 "Super Bear", k-75 "Prince-33", k-153 "Red Onion", k-128 "Kizil Sak", k-85 "K-3", k-81 "K-11", k-83 "K-12", k-80 "K-13", k-95 "Nameless", and k-88 "Nameless" — all outperformed the standard variety k-58 "Kaba-132, St." While the standard variety k-58 "Kaba-132, St." had a leaf length of 18 cm, the other varieties developed leaves ranging from 24 to 52 cm, which is 33.3–188% longer than the standard.

It was found that the onion accessions selected from the collection based on complex traits — k-40 "Rocket", k-43 "Spring Onion", k-50 "Super Bear", k-75 "Prince-33", k-85 "K-3", and k-80 "K-13" — had an average growing period of 115–135 days. These accessions matured 20–40 days earlier compared to the standard variety "Kaba-132." Meanwhile, the other accessions — k-1 "Dermo", k-9 "Brown Beauty", k-194 "Nameless", k-196 "Nameless", k-10 "Kind Variety", k-12 "Pioneer 25013", k-13 "Canade Maple", k-205 "Nameless", k-173 "Nameless", k-185 "Nameless", k-11 "Chalcedon", k-18 "Meteor", k-145 "Nameless", k-151 "Nameless", k-44 "Grandina", k-156 "Nameless", k-164 "Nameless", k-170 "Nameless", k-120 "Nameless", k-153 "Red Onion", k-128 "Kizil Sak", k-81 "K-11", k-83 "K-12", k-95 "Nameless", and k-88 "Nameless" — had a 5–10 day longer growing period than the standard, indicating that they are late-maturing varieties.

1-Table

Indicators of complex characteristics of the world onion collection (2017-2018).

Catalogue number	Country of origin	Variety names of the World Collection	Variety characteristics						
			Number of leaves, pieces	Leaf length, cm	Leaf color	Growing period, days	Bulb weight, g g	Total yield, t/ha	Marketable yield, %
k- 58	Uzbekistan	Kaba-132, St	12	18	Green	155	120	35	90
K-205	Kazakhstan	Nameless	18	36	Green	160	130	26	93
K-145	Belorussia	Nameless	5	32	From green to dark green	165	150	45,9	81
K-40	USA	Roket	15	33	From green to dark green	130	100	24,3	93
K-43	Netherland	Spring Onion	8	24	Fluffy-covered	135	110	25,1	94
K-156	Kazakhstan	Nameless	14	46	Dark green	165	160	45,2	76
K-164	Kazakhstan	Nameless	16	52	From green to dark green	160	150	43,1	78
K-50	Japan	Super Bear	12	36	Light green	115	70	21,6	91
K-75	Netherland	Prince-33	14	36	Light green	120	80	23,4	93
K-85	Korea	K-3	12	37	Fluffy-covered	125	145	43,2	93
k- 80	Korea	K-13	12	36	Green	130	100	26,2	95
k- 95	Netherland	Nameless	6	46	Green	165	110	32,7	93
k-88	Tajikistan	Nameless	11	50	Light green	160	150	41,3	76
NSR ₀₅			0,54	1,64		2,79	3,90	1,39	
Sx%			4,50	4,42		3,99	4,04	4,17	

The morphological characteristics of onion varieties were diverse, the leaf colour of the standard variety was green in the varieties k-58 "Kaba-132, St" and k-205 "Nameless," k-80 "K-13," k-95 "Nameless," the leaf colour of the varieties k-145 "Nameless," k-40 "Roket" and k-164 "Nameless" ranged from green to dark green, the leaf colour of the varieties k-50 "Super Bear," k-75 "Prince-33" and k-88 "Nameless" was light green, and the varieties k-43 "Spring Onion" and k-85 "K-3" had a fluffy coating.

The weight of the onion of the selected varietal samples by complex traits averaged about 70-145 g. Higher results than the standard variety k-58 "Kaba-132, St" (120 g) were observed in the varieties k-205 "Nameless," k-145 "Nameless," k-156 "Nameless," k-164 "Nameless," k-85 "K-3" and k-88 "Nameless," the weight of the bulb averaged 130-160 g, which is 10-40 g or 8.3-33.3% higher than the standard. The remaining varieties k-40 "Roket," k-43 "Spring Onion," k-50 "Super Bear," k-75 "Prince-33," k-80 "K-13" and k-95 "Nameless" formed onions weighing 70-110 g, which is 10-50 g smaller than the standard variety.

The total yield of onion varieties from the collection, selected based on complex traits, varied among varieties. The standard Uzbek variety k-58 "Kaba-132, St" produced a total yield of 35 t/ha. Compared to this standard, the Bulgarian accession k-145 "Unnamed" showed a yield of 45.9 t/ha, which is 10.9 t/ha or 31.1% higher. The Kazakh accessions k-156 "Unnamed" and k-164 "Unnamed" produced yields of 43.1–45.2 t/ha, exceeding the standard by 8.1–10.2 t/ha or 23.1–29.1%. The Korean accession k-85 "K-3" achieved a yield of 43.2 t/ha, 8.2 t/ha or 23.4% higher than the standard, while the Tajik accession k-88 "Unnamed" produced 41.3 t/ha, showing an increase of 6.3 t/ha or 18% compared to the standard variety.

The total yield of the remaining varieties k-205 "Nameless" of Kyrgyzstan, k-40 "Roket" of the USA, k-43 "Spring Onion," k-75 "Prince-33" and k-95 "Nameless" of the Netherlands, k-50 "Super Bear" of Japan, k-80 "K-13" of Korea was 21.6-32.7 t/ha, which is 2.3-13.4 t/ha or 6.5-38.2% less than the standard variety "Kaba-132."

In terms of the quality yield of the total yield of the grown onion variety samples, compared to the standard variety "Kaba-132" (90%), in the varieties k-205 "Nameless," k-40 "Roket," k-43 "Spring Onion," k-50 "Super Bear," k-75 "Prince-33," k-80 "K-13" and k-95 "Nameless," a marketable yield of 91-95% of the total yield was obtained, which is 1-5% higher than the standard, in the remaining varieties k-1 "Dermo," k-9 "Brown Beauty," k-194 "Nameless," k-196 "Nameless,"

k-10 "Kind Variety," k-12 "Pioneer 25013," k-13 "Canade maple," k-173 "Nameless," k-185 "Nameless," k-11 "Halsedon," k-18 "Meteor," k-145 "Nameless," k-151 "Nameless," k-44 "Grandina," k-156 "Nameless," k-1

In terms of marketable yield, the standard variety "Kaba-132" produced 90% marketable bulbs. In comparison, the varieties k-205 "Nameless", k-40 "Rocket", k-43 "Spring Onion", k-50 "Super Bear", k-75 "Prince-33", k-80 "K-13", and k-95 "Nameless" produced 91–95% marketable yield, which is 1–5% higher than the standard. Meanwhile, the other varieties — k-1 "Dermo", k-9 "Brown Beauty", k-194 "Nameless", k-196 "Nameless", k-10 "Kind Variety", k-12 "Pioneer 25013", k-13 "Canade Maple", k-173 "Nameless", k-185 "Nameless", k-11 "Chalcedon", k-18 "Meteor", k-145 "Nameless", k-151 "Nameless", k-44 "Grandina", k-156 "Nameless", k-164 "Nameless", k-170 "Nameless", k-120 "Nameless", k-153 "Red Onion", k-128 "Kizil Sak", k-85 "K-3", k-81 "K-11", k-83 "K-12", and k-88 "Nameless" — showed 76–81% marketable yield, which is lower than that of the standard variety.

Conclusions

The selection of collected varietal samples of onions according to economically valuable and complex traits showed that the varietal samples k-50 "Super Bear," k-75 "Prince-33," k-145 "Nameless," k-156 "Nameless," k-80 "K-13" and k-43 "Spring Onion" should be used as a primary source in the breeding process in order to create new early-ripening, high-yielding varieties with high yield quality.

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