Selection and creation of new high yield and promising varieties based on the use of the world gene pool of onion

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Abstract. In the article, using source of the world collection of onion, promising productive lines were selected and valuable economic characteristics were studied. In the process of studying the selected lines and conducting scientific research, the variety named "Gulkhan" was created, and the valuable economic characteristics of the new variety were highlighted.

1 Introduction

Onion is a common onion belonging to the *Allium* genus, a monocotyledonous class of vegetable crops, the *Liliaceae* family. The head and green leaves of onions are a vegetable that can be eaten all year round and contain a lot of nitrogenous substances (1.7-2.5%), sugar, essential oils, vitamins, enzymes, calcium and phosphorus salts [1, 5-10].

Essential oils give them a unique smell and a sharp taste. Common onion is divided into 3 groups depending on the amount of essential oils in it:

1. Spicy (it contains a lot of essential oils, that is, more than 0.5 grams per 1 kg of onion).
2. Semi-bitter (essential oils from 0.5 to 0.3 grams per 1 kg of onion).
3. Sweeter (essential oils up to 0.3 grams in 1 kg of onion).

Onions grown from seeds in Uzbekistan are two-year-old, and in the first year they produce large bulbs, and in the second year, they bloom and give seeds.

Onion is a cold-resistant plant. Its seeds begin to germinate at a temperature of 3-5, and the bulb grows. A favorable temperature for plant growth and development is 18-28 ℃.

Germinated plants can withstand cold up to 2-3 ℃, and ripe bulbs can withstand short-term cold up to 10-12 ℃. Onions that freeze and slowly fall off do not lose their viability. Onion leaf can withstand cold up to 6-7 ℃ [11-29].

2 Materials and Methods.

Conducting field experiments " Methodology of the State variety testing of agricultural crops" (Moscow, 1975), " Study and maintenance of the world collection of cabbage" (VIR,

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1988), B.J.Azimov., B.B.Azimov's "Methodology of conducting experiments in vegetable growing, rice growing and potato growing" on the basis of methodological manuals, it was conducted in the training field of the Extension Center of Agricultural Information and Consultation under the Tashkent State Agrarian University [4, 7].

3 Results and Discussion

Today, 133 samples of onion are kept alive in the National Gene Fund of the Scientific-Research Institute of Plant Genetic Resources, 20 of which are involved in research.

For our research, the variety "Zafar" (k-58), regionalized in our Republic and widely cultivated in almost all regions, regionalized in 2002, was used as a control variety. The growth period of this variety is 148 days, the average weight of the onion is 120 g, and the average yield is 35-38 t/ha.

The geographical origin of the 20 collection samples involved in the research belongs to 6 countries of the world, including: Uzbekistan, France, the USA, Korea, the Netherlands and Israel.

Samples of onions selected according to characteristics of ripeness. Only 9 according to the characteristic of early ripening, k-19 "Nameless" (France); k-39 "Nameless" (France); k-63, "BGS 72" (USA); k-89 "Nameless" (Israel); k-91 "Nameless" (Israel); k-136 "K-3" (Korea); k-137 "K-4" (Korea); Samples k-141 "K-8" (Korea) and k-143 "K-10" (Korea) were selected.

From these samples k-19 "Nameless" (France); k-39 "Nameless" (France); k-63, "BGS 72" (USA); k-89 "Nameless" (Israel); k-136 "K-3" (Korea); k-137 "K-4" (Korea) and k-143 "K-10" (Korea) samples 8-20 days compared to "Zafar" control variety, k-91 "Nameless" (Israel) and 141 "K-8" (Korea) samples ripened 3-4 days earlier (Table 1).

Table 1. Valuable characteristics of the samples selected for early ripening (2012-2014)

Catalog №	Sample name	Origin	Growing period, day	Onion weight, g	Total yield, t/ha	Product yield, %
k- 58	Zafar	Uzbekistan	148	120	36,8	91,4
k- 19	Nameless	France	135	85	30,2	85,6
k- 39	Nameless	France	140	130	43,6	92,2
k-63	BGS 72	USA	138	75	28,5	85,2
k-89	Nameless	Israel	138	80	32,1	86
k-91	Nameless	Israel	145	90	33,5	84,2
k-136	K-3	Korea	137	70	36,4	89
k-137	K-4	Korea	125	140	45,9	95,2
k-141	K-8	Korea	144	95	34,6	87,5
k-143	K-10	Korea	128	45	26,9	80,3

The yield of two plants and the size of the onion from the variety samples selected from the onion collection according to the characteristic of early ripening compared to the control variety: k-39 " Nameless " (France) and k-137 "K-4" (Korea) samples 6 k-19 "Nameless" (France); k-63, "BGS 72" (USA); k-89 "Nameless" (Israel); k-91 "Nameless" (Israel); k-136 "K-3" (Korea); к-141 "K-8" (Korea) and к-143 "K-10" (Korea) samples are 2.2-9.9 t/ha and 25-75 grams lower than the control in terms of yield and onion size.

Onion samples selected according to productivity characteristics. 5 out of 20 samples compared to the control in terms of yield and onion size (6.8-12.9 t/ha and 10-40 g), the yield from 20 samples is the average control per hectare when determining lines. varieties with a high yield (36.8 t/ha) were selected (Table 2).

Table 2. Valuable economic characteristics of the samples selected for productivity (2012-2014)

Catalog №	Sample name	Origin	Growing period, day	Onion weight, g	Total yield, t/ha	Product yield, %
k- 58	Zafar	Uzbekistan	148	120	36,8	91,4
k- 39	Nameless	France	140	130	43,6	92,2
k- 64	BGS 615	USA	155	150	48,3	82,6
k-94	Nameless	Netherlands	165	160	49,7	86,4
k-135	K-2	Korea	175	150	48,5	83
k-137	K-4	Korea	125	140	45,9	95,2

K-39 "Nameless" (France); k-64 "BGS 615" (USA); k-94, "Nameless" (Netherlands); K-135 "K-2" (Korea) and K-137 "K-4" (Korea) samples were selected.

Among these samples, only sample k-39 "Nameless" (France) and sample k-137 "K-4" (Korea) showed 8-23 days earlier compared to the control variety.

The remaining k-64 "BGS 615" (USA); k-94, "Nameless" (Holland) and k-135 "K-2" (Korea) samples ripened 7-27 days later than the control variety (Table 2).

K-39 "Nameless" (France) in comparison with the control variety in terms of yield and onion size of the variety samples selected according to the spring onion yield characteristic; k-64 "BGS 615" (USA); k-94, "Nameless" (Netherlands); k-135 "K-2" (Korea) and k-137 "K-4" (Korea) samples are all similar to the "Zafar" variety in terms of productivity.

Onion samples selected according to their quality. The marketability of any agricultural products exported to foreign countries plays an important role.

Therefore, in 20 samples of onion, when selecting the samples with high yield quality compared to the control variety, 6 of them had a high yield of 92.2-95.2% (Table 3).

K-39 "Nameless" (France); k-60 "BGS 68" (USA); k-93, "Nameless" (Netherlands); k-134 "K-1" (Korea); k-137 "K-4" (Korea) and k-142 "K-9" (Korea) were selected.

Among the selected samples, k-137 "K-4" (Korea) showed the highest yield by 95.2 percent.

The reason for this is the suitability of the selected line to the soil and climate conditions of the Tashkent region and the characteristics of this line.

The remaining k-39 "Nameless" (France); k-60 "BGS 68" (USA); k-93, "Nameless" (Netherlands); k-134 "K-1" (Korea); к-137 "K-4" (Korea) and k-142 "K-9" (Korea) samples were found to have an average 0.8-3.8% higher yield than the control "Zafar" variety.

Table 3. Valuable economic characteristics of the samples separated by the trademark (2012-2014)

Catalog №	Sample name	Origin	Growing period, day	Onion weight, g	Total yield, t/ha	Product yield, %
k- 58	Zafar	Uzbekistan	148	120	36,8	91,4
k- 39	Nameless	France	140	130	43,6	92,2
k- 60	BGS 68	USA	160	110	34,6	92,7
k- 93	Nameless	Netherlands	150	110	33,7	94,2
k- 134	K-1	Korea	170	100	35,2	93,1
k-137	K-4	Korea	125	140	45,9	95,2
k- 142	K-9	Korea	175	120	36,5	94,2

Among the world collection of onions, the following samples with high market value are k-60 "BGS 68" (USA); k-93, "Nameless" (Netherlands); k-134 "K-1" (Korea) and к-142 "K-9" (Korea) showed a delay of 2-27 days from the sample Zafar, on the contrary, k-

39 "Nameless" (France) and k-137 " K-4" (Korea) samples showed 8-23 days earlier than the control variety (Table 3).

The yield and onion size of two samples of the variety selected according to the trademark of the product, compared to the variety. It was observed that compared to the variety, 6.8-9.1 t/ha and the size of the onion head was 10-20 grams higher. The remaining k-60 "BGS 68" (USA); k-93, "Nameless" (Netherlands); k-134 "K-1" (Korea) and k-142 "K-9" (Korea) showed a lower productivity of 0.3-3.1 t/ha compared to the control variety.

As a result of a three-year study of 20 samples of the world's collection of onions, 8 were selected according to complex characteristics, including: k-19 "Nameless" (France); k-137 "K-4" (Korea); k-143 "K-10" (Korea); k-94 "Nameless" (Netherlands); k-135 "K-2" (Korea); k-93 "Nameless" (Netherlands); k-134 "K-1" (Korea) and k-142 "K-9" (Korea) were selected (Table 4).

Table 4. Valuable economic characteristics of the samples selected from the world gene pool of onion according to complex characteristics (2012-2014)

Catalog №	Sample name	Origin	Growing period, day	Onion weight, g	Total yield, t/ha	Product yield, %
k- 58	Zafar	Uzbekistan	148	120	36,8	91,4
k- 19	Nameless	France	135	85	30,2	85,6
k-137	K-4	Korea	125	140	45,9	95,2
k-143	K-10	Korea	128	45	26.9	80,3
k-94	Nameless	Netherlands	165	160	49,7	86,4
k-135	K-2	Korea	175	150	48,5	83
k- 93	Nameless	Netherlands	150	110	33,7	94,2
k- 134	K-1	Korea	170	100	35,2	93,1
k- 142	K-9	Korea	175	120	36,5	94,2

Onion samples selected according to complex characteristics. Onion samples selected according to complex characteristics. 3 of the samples selected according to complex characteristics are compared to the control Zafar variety k-19 "Nameless" (France); k-137 "K-4" (Korea) and k-143 "K-10" (Korea) samples had a short growth period of 13-20 days, while the remaining k-94 "Nameless" (Netherlands); k-135 "K-2" (Korea); k-93 "Nameless" (Netherlands); k-134 "K-1" (Korea) and k-142 "K-9" (Korea) samples, on the other hand, were found to ripen up to 2-27 days later.

If we compare the yield control to the variety, five k-19 "Nameless" (France); k-143 "K-10" (Korea); k-135 "K-2" (Korea); except for k-93 "Nameless" (Netherlands) and k-134 "K-1" (Korea) samples, all other complex characteristics were superior.

In particular, the average yield of the k-94 "Nameless" sample brought from the Netherlands was 49.7 t/ha, which was 12.9 t/ha higher than the control. 2 samples were brought from Korea (k-137 "K-4" and k-135 "K-2"), the average yield was 45.9-48.5 t/ha, compared to the control "Zafar" variety the high yield had high results of 9.1 and 11.7 t/ha, respectively.

K-137 "K-4" (Korea); k-134 "K-1" (Korea); k-93 "Nameless" (Netherlands) and k-142 "K-9" (Korea) samples were found to have a high yield of 1.7-3.8%, while the remaining k-19 "Nameless" (France); k-143 "K-10" (Korea); It was found that the marketable productivity of samples k-94 "Nameless" (Netherlands) and k-135 "K-2" (Korea) is 5-11.1 percent.

As a result of studies, the average yield of the Korean (k-137) "K-4" sample was 45.9 t/ha, and it was noted that the control has a higher yield than the variety by 9.1 t/ha.

In terms of the size of the onion and the high yield of this sample, as well as the short growth period of 23 days, the control has a high advantage over the variety, and k-137 "K-4" which is high in other valuable economic characteristics (Korea) line was separated.

During the years 2012-2014, research was continued on the K-137 "K-4" (Korea) sample selected for complex characters, and it was planted in a remote protected area and selected for the shape, density, color and other characters of onions. was carried out.

Clean lines with uniformity in basic economic characteristics were isolated.

Elite plants were selected based on individual and family selection based on the shape, size and density of the onion from the clean lines separated during 2015-2017. In 2018 seeds were propagated from selected elite plants.

During the years 2018-2020, the competitive variety test of the elite plant, that is, the new Gulkhan variety of onion, was studied in comparison with the control variety "Zafar". The data obtained on the basis of the study were analyzed.

In 2021, the k-4 variety that successfully passed the competitive test was submitted to the State variety test under the name "Gulkhan" and was entered into the state register, and a patent was obtained for the new variety of Onion "Gulkhan".

"Gulkhan" variety. The Gulkhan variety is an early variety of spring onion (*Allium cepa* L.). Created by individual and family selection from a sample isolated by analytical selection using a world collection.

Planting periods: It is recommended to plant seedlings or seeds in open fields in different planting periods (early spring - late February-early March; summer-autumn - August-September and before winter - late November-December), the yield is 45-50 t /ha, growing period 125-130 days.

The plant type is bulbous, the height of the seedling is 35-40 cm, the shape of the leaf surface is tubular, the color of the leaf is dark green, the surface of the leaf is smooth. The shape of the onion is wide inverted-ovoid, the shape of the cross section of the onion is round, there is no porosity of the onion, the color of the onion is dark brownish red.

Table 5. Biochemical composition of newly created vegetable crops (2021-2022 year)

Variety	Biochemical composition of onion (per 100 g wet weight, in % and in milligrams)				
	sugar, %	dry matter, %	protein, %	ascorbic acid, mg	Nitrates, mg
Gulkhan	6,6	12,7	1,02	20,0	155

It showed that the amount of sugar in "Gulkhan" variety of onion was 6.6%, dry matter content was 12.7%, protein content was 1.02%, ascorbic acid content was 20.0 mg, and nitrate content was 155 mg.

4 Conclusion

The morphobiological and economic characteristics of 20 types of onions were analyzed, as a result, new local varieties of "Gulkhan", suitable for cultivation in open and protected areas, at different planting periods, and having valuable economic characteristics, were created.

The growth period of the control variety is shorter by 23 days, the average yield per hectare of the "Gulkhan" variety is 43.7 tons, and the yield is 10.1 tons higher than that of the control variety.

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