

Development of the method of producing quality seed by onions

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Abstract: This article presents the results of the experiment on the development of a new resource-saving method of growing seeds of Istikbol onion by leaving the bulbs in place and burying seeds and producing high-quality seeds. According to the research, due to the fact that the physiological process in the onion heads did not stop and the root system was developed compared to the control, the emergence of bulbs, the day of flowering, and the period of seed ripening were extended by 20-34 days more than the control, due to which the yield was 532 kg on August 30, 515 kg on September 9, September 19 Making 491 kg, the yield was higher by 14.2-23.7% compared to the control variety.

1 Introduction

Onion is an important component of the human vegetable diet and is one of the types of vegetables rich in healing, dietary, digestive, bactericidal, various medicinal properties and essential oils. In addition to daily use, it is included in the processing industry and exported to foreign countries. Onion is a two-year vegetable crop. In the republic, onions are grown on an area of 35-40 thousand ha, the average yield is 25-30 t/ha, seed yield is 300-350 kg/ga.

Taking into account the high demand for onion seeds and the rising price of onion bulbs in the republic, it is important to develop a resource-efficient method of growing onion seeds [1-4]. The technology of onion seed cultivation is usually the first year in our republic, the seeds are sown in early spring and quality care is taken based on the usual technology. Medium-sized, medium-sized, variety-specific, shape and color bulbs are selected for seeding. Seed bulbs are stored well in dark places at a temperature of 2-8 °C and an air humidity of 70-80. These well-preserved bulbs are planted [2, 5-10]. Of course, some costs are spent on sorting and preserving the cultivated onion until the land is prepared with high quality. In order to reduce these costs and reduce the cost of onion seeds, we have aimed to develop a resource-efficient method of onion seed cultivation in our research.

The purpose of the experiment is to develop a method of growing quality seeds by burying the bulbs at different times without transplanting them. According to the research, a

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medium-prospect variety of onion created by breeder scientists of the institute and included in the State Register was obtained. In the experiments, seed yield and seed quality of mid-ripe Istiqbol variety of onion grown in 2017-2024 were determined.

2 Conditions and method of research

The research was conducted in the experimental fields of the Research Institute of Vegetable, Melon Crops and Potato in 2017-2024. The institute is located in the north of the city of Tashkent in the Tashkent district of the Tashkent region. The climate of the place is similar to the conditions of most vegetable farms located in the plains of Uzbekistan.

The peculiarity of the weather is that there is enough light and heat, and continental variable and dry air. The duration of sunlight is 2,700-3,000 hours per year, while in summer it is 360-400 hours per month, and in winter it is 90-130 hours. The daily temperature is highly variable (10-15°C in winter and 15-20°C in summer) and reaches up to 30°C throughout the year.

A typical gray soil with previously irrigated soil, seepage water is located at a depth of 6-7 meters, the content of humus in the soil is 0.793-0.957%, total phosphorus is 0.131-0.157 mg/kg, potassium is 1.843-2.195 mg/kg, and nitrogen is 0.131-0.92%. N-NO₃-8.1-17.9 mg/kg, P₂O₅-12.4-28.4 mg/kg, K₂O-187.5-227.4 mg/kg. The soil of the experimental area is not saline.

Onion bulbs and seeds are the object of this study. Researches were carried out in field and laboratory conditions, based on methodological manuals such as "Methodology of conducting experiments in vegetable growing, potato growing and potato growing", "Metodika polevogo opyta", "Metody agrokhimicheskikh analizov pochv sredney Azii" [1;3;4].

3 Research results and their discussion

In the experiments, onion seedlings of Istikbol variety were prepared and planted, and onion heads were grown. In addition, it was learned to leave the mother bulbs in place and bury them in the specified periods. In 2015-2017, the mother bulbs of the medium-ripe Istiqbol variety of onion were left in place according to the methods of cultivation (Table 1).

Table 1. Periods of cultivation of the Istikbol variety of onion leaving the mother bulbs in place (2017-2024).

Options	Planting periods	Experimental methods
I	30.08	Ripe onions were left in place and buried immediately
II	09.09	The bulbs were left in the open field and buried after 10 days
III	19.09	Bulbs were left in place in an open field and buried after 20 days
IV	26.09 (control)	The harvested bulbs were stored in the warehouse and planted in the open field after a rest period.

Since the main goal of our experiment was to develop a resource-efficient method of growing seeds by leaving the mother bulbs in place, onions were planted in the seedling method.

4 Preparation of onion seedlings

Onions are mainly grown from seeds. In recent years, the technology of growing onions from seedlings has been developed by scientists of the institute. 3-4 kg of onion seeds are needed to prepare onion seedlings for 1 hectare of land. In our experiments, fields freed from evening potatoes were used for the preparation of onion seedlings. After the harvest of evening potatoes, the field was cleaned from previous crop residues and weeds, organic and phosphorous chemical fertilizers were applied to the area of 500 m². On November 20-25, onion seeds were sown (sown) in a 4x1 cm pattern to prepare onion seedlings in this area. Since onion is a cold-resistant plant, its seeds begin to germinate at 3-5°C, and sprouts germinate quickly at 18-20°C. Germinated sprouts can withstand 2-3°C, and adults 10-12°C. Even so, in order to prepare onion seedlings in a high-quality way, after planting onion seeds, two-layer film arcs were drawn on them. In order to prevent the emergence of weeds, the soil was treated with the herbicide ENTOSTOP 2.3-4.5 l/ha, against one-year dicotyledonous and spiky weeds, until the sprouts turn green. Irrigation and feeding works were carried out until the 1st-2nd ten days of March.

Growing onions from seedlings. After the onion seedlings were 55-60 days old, 3-5 days before planting, seedlings with a height of 10-12 cm and a root of 2-3 cm were planted on March 10-20, according to weather conditions.

Land is prepared in autumn for planting onion seedlings in spring. In this case, the experimental area was qualitatively cleaned from foreign bodies. The soil is softened to a depth of 20-25 cm, after the large lumps are crushed, it is well leveled and the irrigation egates are removed. If it is planned in spring, due to the arrival of buttermilk in March or the late arrival of spring, there may be a delay in land preparation and planting.

In our experiments, onion seedlings were planted in 2015-2017 in the 1st-2nd ten days of March, depending on weather conditions, in a three-row ribbon method. Seedlings were planted after they were well established. Weeds were removed by softening the rows to a depth of 15-16 cm.

Onion is a root vegetable, and the root system is mostly located near the top of the soil. Therefore, it requires a lot of basic nutrients in the upper part of the earth. Since the soil of the institute is gray soil, on average 300 kg of nitrogen, 220 kg of phosphorus and 90 kg of potassium were given to each hectare of land. After planting the seedlings and during the formation of the onion head, the water demand of the crop is especially high. Only at the end of the growing season and when the onion heads are set, the plant's water demand is slightly reduced. In the institute, the groundwater was deep, and the soil was gray soil, so onions were watered every 7-10 days. After bulb growth stopped, the crop was irrigated twice at 12-14 day intervals, and irrigation was stopped one month before harvest.

Onions are damaged by onion fly, tobacco thrips, autumn nightshade, false powdery mildew, root rot, mosaic, yellowing, joint rot. In our experiments, tobacco thrips and yellowing were observed on onions. Against him Karate 5% em.k. (30-40 ml), Topaz 10% em.k. (12.5-15 ml) preparations were mixed and sprayed in 60 liters of water.

When growing onions from seedlings, the harvest was in August and 50-60 tons of product and mother onions were grown per hectare. Growing onions from seedlings has a number of advantages. Including:

- seed consumption was saved by 3-4 times;
- costs of weeding and weeding during the onion growing season are reduced by 80-90 percent;
- the gross product obtained from one land in one season has doubled.
- the water used for irrigation decreased by 2.0-2.5 times.

Usually, when onions are grown by the seedling method, they are planted in a four-row ribbon pattern $(40+10+10+10)/4 \times 7.5$ cm for growing products. If planted in this scheme,

800,000 seedlings will be planted per hectare. Taking into account that the continuation of our experiments is related to seed production and leaving bulbs in the field itself, a three-row ribbon planting scheme (50+10+10):3x7 cm was used. The reason is that the space between the rows is 70 cm. when planted in three rows, one row of 70x15 cm onion heads were left in the middle, due to the fact that the onions in the two outer rows and one in the middle row were harvested in August (Table 2).

Table 2. Indicators of germination of mother bulbs of the Istikbol variety of onion (2017-2024).

Options	Planting periods	Number of buried mothers, pcs	Bruised, sun		Bruised number of mothers		The number of leaves in one bush		Leaf length	
			October-November							
			10%	75%	pcs	control of the equal, %	pcs	control of the equal, %	cm	control of the equal, %
I	30.08	160	34	74	158	112,1	4,3	143,3	25	125,0
II	09.09	160	25	62	155	109,9	4,0	133,3	24	120,0
III	19.09	160	21	56	152	107,8	3,3	110,0	23	115,0
IV	26.09 (control)	160	17	50	141	100,0	3,0	100,0	20	100,0

The commercial harvest of the Istikbol variety of onion was ripened in August, in order to obtain seeds, in our experiments, the bulbs were left in place on August 30 and immediately buried. According to the four options, the bulbs that remained in place were watered before burial, depending on the time of planting the mother bulbs. After soil preparation, the interstices were cultivated at a depth of 15-18 cm with the help of mechanisms, and the mother bulbs left in place as a result of re-extraction of the stems were buried at a depth of 6-8 cm.

On September 26, in the control option, 160 seedlings of the Istikbol variety of onion were planted in the 4th row, 4th row. According to him, the germination of 10 percent of the bulbs buried instead of August 30 was 34 days, and the germination of 75 percent was 74 days. That is, it took 17-24 days longer than the control option until the onion heads passed the dormancy period and germinated. On September 26, the number of matured mothers was 141, compared to the control option on August 30, 12.1%, on September 9, 9.9%, and on September 19, 7.8%. mothers germinated more plants than the control variant. In the control option planted on September 26, the number of leaves on one bulb was 3.0 100.0%, on August 30 it was 4.3 43.3% compared to the control option, on September 9 it was 4.0 33.3%, On September 19, there were 3.3 10.0 percent more leaves. In the control option planted on September 26, the length of the leaves on one bulb was 20 cm 100.0%, in the control option 25 cm on August 30, 25% compared to the control, on September 9, 24 cm, 20.0% compared to the control, on September 19, 23 cm, 15.0 percent leaves were longer than the control. The phenological indicators of mother onion heads of the Istikbol variety were studied (Table 3).

Table 3. Phenological indicators of mother onion heads of the prospective variety (2017-2024).

Options	Planting terms	Number of mothers, pcs	Number of seedlings out of winter, pcs		Flowers appearance, Day		Flowering, day		Seedeater, day	
			march	control of around, %	10%	75%	10%	75 %	10 %	75%
I	30.08	160	155	114,8	214	223	256	261	274	285
II	09.09	160	151	111,8	205	212	248	253	265	276
III	19.09	160	148	109,6	202	208	238	242	257	268
IV	26.09 (control)	160	135	100,0	194	199	234	237	249	259

160 mothers of the Istikbol variety of onion were planted according to each planting period, and the number of plants that emerged from the winter was determined in the 2nd ten days of March. According to the studies, in the version where the control bulbs were buried on September 26, the number of seedlings that came out of the winter was 135, 100 percent, compared to it, the number of seedlings that came out of the winter of the bulbs that were buried 26 days ago, that is, on August 30, was 155, compared to the control. The number of overwintered seedlings increased by 14.8%. This pattern was also observed in the options planted on September 9 and September 19. Compared to the control option, the number of overwintered seedlings increased by 9.6-11.8%.

It took 194 days for the emergence of 10 percent of buds in the Istikbol variety planted on September 26 in the control variant, and 199 days were needed for the emergence of 75 percent of buds. Accordingly, in the variant planted on August 30, it took 214 days for the emergence of 10 percent buds, and 223 days for the emergence of 75 percent. It took 20-34 days longer than the control option for 10-75% emergence of flower stalks of bulbs buried in this option.

In the variant planted on September 9, it took 200 days for the emergence of 10% of flower stalks, and 207 days for 75%, that is, it was observed that it took 11-13 days more time for the emergence of 10-75% of the flower stalks of bulbs planted in place than in the control variant.

In the variant planted on September 19, it took 198 days for the emergence of 10% of flower stalks, and 208 days for 75%, that is, it was observed that it took 8-9 days more time than the control variant for the emergence of 10-75% of the flower stalks of bulbs buried in place. It took 234 days to reach 10% flowering of the Istikbol cultivar buried in the control option on September 26, and 237 days to reach 75% flowering. It was observed that the flowering of bulb heads buried in place (10-75%) was 22-24 days longer than the control option.

On September 9, it took 248 days to reach 10% flowering and 253 days for 75% of the left-in-place option, which means that in this option, it took 14-16 days longer for bulbs buried in place to flower (10-75%) than in the control option.

This pattern was also observed in the variant planted on September 19, but the duration of flowering for planting periods 1-2 did not differ much from the control variant, that is, it took 239 days for 10% flowering in this period, and 242 days for 75%, which means that in this variant, buried in place it was observed that the duration of the flowering period of bulbs (10-75%) was 4-5 days longer.

It took 249 days for 10% seed ripening of the Istikbol variety planted on September 26, and 259 days for 75% seed ripening, respectively, it took 274 days for 10% seed ripening and 285 days for 75% seed ripening for the variety planted on August 30. It was observed that it took 25-26 days more time for seed ripening (10-75%) of bulb heads buried in place in the variant, compared to the control variant. In the option planted on September 9, it took 265 days for 10% seed ripening, 276 days for 75%, that is, in this option, it was observed

that it took 16-17 days more time for the seed ripening (10-75%) of bulb heads buried in place, compared to the control option. In the option planted on September 19, it took 257 days for 10% seed ripening, 268 days for 75%, that is, in this option, it was observed that it took 8-9 days more time for seed ripening (10-75%) of onion heads buried in place, compared to the control option. (Table 4).

The large number of seedlings and buds that emerged from the winter, the long flowering and seed ripening period of the buried variants, leaving the Istikbol onion in place, had a positive effect on the seed yield.

Table 4. Productivity of the Istikbol variety of seed onion indicators (2017-2024).

Options	Planting terms	Harvest date	Productivity, kg / ga	Control around, %
I	30.08	18.06	532	123,7
II	09.09	18.06	515	119,7
III	19.09	18.06	491	114,2
IV	26.09 (control)	18.06	430	100,0
LID _{0,05} kg/ga			1,5	
S _x , %			2,4	

The seeds of the Istikbol variety of onions planted for seed production in different periods were collected in one period on the 2nd day of June. It took 258 days for the variety planted on August 30, 249 days for the variety planted on September 9, 238 days for the variety planted on September 19, and 232 days for the control variety planted on September 26.

The seed yield of Istikbol variety planted on September 26 in the control option was 430 kg, i.e. 100%, compared to it, it was 532 kg in the option planted on August 30, which was 23.7% higher than the control option. In the variant planted on September 9, the seed yield was 515 kg and yielded 19.7% higher than the control variant. This pattern was also observed in the variant planted on September 19. . In our experiments, it was found that the number of seedlings that came out of the winter, the long period of flowering and seed ripening in the options buried leaving the onion variety in place had a positive effect on the seed yield, and the average yield was 14.2-23.7% higher than the control option. After the seeds were harvested, the germination capacity and fertility indicators were determined depending on the sowing period (Table 5).

Table 5. Fertilization indicators of the Istikbol variety of seed onions (2017-2024).

Options	Planting terms	1000 grain germ, g	Control around, %	Germinati on capacity, %	Uniqueness , %
I	30.08	3,6	116,1	88,0	98,0
II	09.09	3,5	112,9	86,0	95,0
III	19.09	3,4	109,6	84,0	91,0
IV	26.09 (control)	3,1	100,0	82,0	88,0

The weight of 1000 seeds was 3.1 grams, i.e. 100%, in the Istikbol variety planted on September 26 in the control option, compared to it in the option planted on August 30, it was 3.6 grams and 16.1% heavier than the control option. In the option planted on September 9, the seed yield was 3.5 grams and was 12.9% higher than the control option. This pattern was also observed in the option planted on September 19. determined in laboratory experiments. According to experimental options and planting dates, the seed germination capacity was determined, the control was 82% in the option planted on

September 26, the germination capacity of the option planted on September 30 was 88%, 6% higher than the control option, and 86% in the option planted on September 9, the control 4% higher than the variant, and the variant planted on September 19 was found to be 2% higher than the control variant (Table 3.6).

Germination of seeds of Istikbol variety of onion was carried out in the thermostats of the institute's seed laboratory. It required 1 kg of seed, 50 grams of sample, filter paper for recovery, petri dish. Also, the temperature of the room of the thermostat was constant 15-20 0C, there was no light inside the thermostat. It also took 5 days to determine the germination energy of onions, and 12 days to determine the germination (Table 6).

Table 6. Determining the germination of seeds of Istikbol variety of onion (2017-2024).

Crop	Seed quantity	Sample quantity, g	Environment for collection	Charging temperature, + ⁰ C		Light temperature	Determination time, day	
				regular	flexible		germination capacity	flourish
onion	1, 0	50	Φ*	15-20	8-12	dark	5	12
F*-filtr of paper								
Crop type		Grade purity by grade, not less than %			Seeds of other varieties, not more than%, in the general mixture in Grade 3			
onion		1	2	3	4			
		99	96	90				

The yield and effectiveness of onions are fully manifested only when planted with high-quality, sara seeds. The seed laboratory of the institute deals with the preparation of such seeds and introduction of the best varieties into production. For this reason, research was conducted in this direction. Seed production itself is a special branch of agriculture, the purpose of which is to mass-produce seeds of a variety in the required amount, while maintaining their productivity, biological and productivity qualities. Seed production has two interrelated functions. The first of them is the mass reproduction of high-quality seed of new varieties introduced into production in accordance with the demand. But in the process of mass reproduction and long-term cultivation, the variety may weaken and its yield quality may decrease. Therefore, the second task of seed production is to preserve the fertility and yield quality of regionalized crop varieties. In our experiments aimed at developing resource-saving technologies of growing onion seeds, special importance was paid to maintaining the yield and yield quality of onion seeds. Through this method, the yield of onions is often renewed. Varietal renewal is the replacement of seeds with reduced fertility and biological qualities with fertile and high-quality seeds specific to this variety. Elite seeds are the initial seeds grown at the institute for reproduction in production. The best elite seeds of this variety are prepared from the offspring of the best selected plants that fully embody the productivity characteristics of the variety, high variety purity and similarity, resistance to diseases and pests, quality of preparation for planting. The next generation of elite seeds is reproduction. The first-year seeds obtained from the elite are called the first reproduction (R1), in turn, the seed obtained from the first reproduction is called the second reproduction (R2), and in this order the seeds of the third (R3), fourth (R4), etc. reproductions are called. The fifth, sixth and lower reproduction seeds used in production are replaced by elite and first reproduction seeds in the renewal of the variety.

Fertile seed can show its advantages only when it is of high quality. Planting and fertility qualities of the seed are distinguished. Planting qualities of seed include purity (level of contamination), germination capacity, germination, moisture content, 1000 seed weight, and disease and pest susceptibility. Seed quality refers to its purity and uniformity.

In our experiments, the weight of 1000 onion seeds was in the range of 3.1-3.6 grams, depending on the sowing period.

In seeds with high purity of the variety, all characteristics and signs of the variety are completely inherited. High-quality fertile seed must have high seed purity as well as high planting qualities. For example, elite seeds of any crop must be 100% pure (mixture of seeds of other varieties or forms should not exceed 0.2%), high seed weight of 1000 seeds, free from diseases and pests, not less than 85-95% fertility, and must not be contaminated.

The importance of high-quality seed for high crop yield and product quality is no less important than important agro-measures such as fertilization and tillage. The norms of possible differences from the parameters determining seed quality are determined in the State Standards. In this case, the seeds are divided into quality groups of different values, i.e., into classes according to fertility, into categories according to fertility qualities.

Onion seeds must have at least the following parameters in terms of planting quality: 1st class - purity 99%, germination 95%; Class 2 - 96% and 90%; Class 3 - 95% and 90% should be. In our research, the seeds of the Istikbol variety were 99% class 1, 2 class - 96%, and 3 class - 90%, and their fertility was 98% in the August 30 planting period, and 95% in the September 9 planting period.

Practical experience shows that the quality of varieties that have been cultivated for a long period of time and when the norms of seed production are violated, the yield decreases. This situation is determined by biological changes that occur as a result of separation and mutational changes under the influence of the external environment with mechanical pollution of the seed. One of the main reasons for the weakening of the variety is the mixing of seeds of another variety (variety) and other crops (variety) during planting, harvesting, transportation and storage.

5 Conclusions

1. In 2017-2024, a resource-efficient new method of growing onion seeds by burying them for different periods was developed, leaving the mothers of the promising variety of onion in place.

2. When the Istikbol variety of onion was buried leaving the mother plants in place, compared to re-burying the onion heads, the number of mother plants that bloomed in October and November increased by 7.8-12.1%, the number of leaves per plant increased by 10.0-43.3%, leaf and the length was 15-25% higher than the control variant.

3. When the Istikbol variety of onion was left in place and buried, the number of plants that came out of the winter increased by 9.6-14.8% compared to when the bulbs were replanted.

5. Due to the fact that the physiological process in the bulbs did not stop and the root system was developed compared to the control, the appearance of bulbs, the day of flowering, and the period of seed ripening were extended by 20-34 days more than the control, due to which the yield was 532 kg on August 30, 515 kg on September 9, September 19 Making 491 kg, the yield was higher by 14.2-23.7% compared to the control variety.

6. The weight of 1,000 seeds on the day of flowering, due to the long period of seed ripening, in the variants that leave the mothers of the Istikbol variety of onion in place, is 3.4 to 3.6 grams for different planting periods, which is 9.6-16.1% more than the control variant. was found to be high in laboratory analysis.

7. When the fertility of cultivated seeds was analyzed by variants, it was found in laboratory experiments that the germination power was 2-6% (84-88%), and the fertility was 3-10% (88-98%) higher than the control variety.

8. When studying the yield level of the seeds grown in the variants that left the mothers of the Istikbol onion in place, on August 30 - 138.3%, on September 9 - 130.7%, on September 19 - up to 120.0%, and on September 26 in comparison with the current technology, it was found in the experiments that the yield level was 44.5-62.8% higher.

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