

Terms of cultivation of varieties of sweet potato as the main and secondary crops

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Abstract

The research is aimed at studying the growth, development, formation of the crop of tops and tubers, indicators of productivity, yield and storability, depending on the timing of planting seedlings of new sweet potato varieties as the main and secondary crops, and on their basis to determine the optimal timing for planting seedlings of sweet potato varieties, both main and secondary.

Field experiments were carried out in 2019-2021 under the conditions of irrigated typical gray soils of the Samarkand region. Varieties of sweet potato Khazina (standard), Sochakinur, Tailoki, Filial with planting dates of April 10 (control), April 20, April 30, April 10, 20, and May 30, 2005 in the main culture were comparatively evaluated, and in the secondary culture, the seedling planting dates of June 20, 30, and July 10 were compared (control). The seedling planting scheme for all periods was 90x20x1 cm. Sprouted seed tubers weighing 120-150 g were taken from sweet potato varieties, they were planted in a film nursery at a depth of 4-5 cm, soil moisture was maintained at least 65-70%, after 45-48 days of care, seedlings with 4-5 leaves were grown, ready for planting in the field.

It was revealed that when cultivating varieties of sweet potato as the main and secondary crops, depending on the timing of planting, the seedling yield from each seed tuber was 12.8-20.7 pieces, the largest seedling yield (15.4-20.7 pieces) was observed in varieties Sochakinur, Tailoki, Filial. The duration of the growing season for the standard was 132-142, and for new varieties 119-136 days. The vegetation period of the studied varieties in the main culture was extended by 2-7 days compared to planting as a second crop.

It has been established that under the conditions of irrigated typical sierozem soils of the Samarkand region, in order to obtain a high yield (50 t/ha and more as the main crop, and 35-40 t/ha in the secondary crop), it is advisable to cultivate sweet potato varieties Sochakinur, Tailoki, Filial, plant seedlings of these varieties in the main culture on April 20-30 and in the secondary culture on June 20-30 according to the scheme 70x25 and 90x20 cm.

Key words: varieties of sweet potato; main and secondary crops; planting dates; growing season; yield; marketability; shelf life

INTRODUCTION

In agriculture of the republic, despite the fact that the sweet potato is a new crop, large-scale scientific research is being carried out to increase the

yield and quality of the crop. In particular, breeding methods are being developed to create new early-ripening, adapted varieties, and methods of cultivation agrotechnology are being improved in

various soil and climatic conditions of the country (Ostonakulov, 2003; Ostonakulov et al., 2019, 2020).

In the State Register of the Republic of Uzbekistan, since 2021, it has been recommended for sowing in the republic the sweet potato varieties Khazina, Guliston, Sirdaryo, Sochakinur, Tailoki, and since 2022 - the Filial variety, the selection of the authors. However, the possibilities for identifying newly released varieties of this crop when cultivated as the main and secondary crops have not been studied.

Taking this into account, in 2019-2021 we conducted field experiments in the conditions of irrigated typical gray soils of the farms "Barat Turdiev" and "Meros" of the Ishtikhan district of the Samarkand region.

MATERIALS AND METHODS

The soils of the experimental plot are medium loamy in terms of mechanical composition, with a depth of groundwater of 10-12 meters, the agrochemical composition of the arable horizon is characterized by a humus content of 0.9%, gross nitrogen - 0.08%, phosphorus - 0.14%, nitrate-nitrogen (N-NO_3) - 6.74, mobile phosphorus (P_2O_5) - 16.38, exchangeable potassium (K_2O) - 208 mg/kg of soil, that is, the level of soil nitrogen supply is very low, phosphorus - low, exchangeable potassium - medium.

Varieties of sweet potato Khazina (standard), Sochakinur, Tailoki, Filial with planting dates of 10.04 (control), 20.04, 30.04, 10.05, 20.05, 30.05 in the main culture were comparatively studied; 10.07 (control). The planting scheme for all periods was 90x20x1 cm. From all the studied varieties of sweet potato, the same seed tubers weighing 120-150 g were taken, the germinated tubers were planted in a film nursery at a depth of 4-5 cm, soil moisture was maintained at 65-70%, after 45-48 days of care, seedlings with 4-5 leaves were grown, ready for planting in open ground. The previous crop growing before sweet potato was winter wheat.

The area of the plot is 36 m², the repetition of the experiment is 3-4 times.

On the experimental plot, all records analyses, calculations, planting, care, harvesting, etc. were carried out according to the generally accepted

methodology and agro recommendations (Dospekhov, 1985; Azimov & Azimov, 2002).

RESULTS AND DISCUSSION

The results of the study showed that when cultivating varieties of sweet potato Khazina (standard), new ones - Sochakinur, Tailoki, Filial, as the main and repeated crops at different planting dates, the yield of seedlings from each seed tuber was 12.8-20.7 pieces, the highest yield seedlings (15.4-20.7 pcs.) was observed in varieties Sochakinur, Tailoki, Filial.

The duration of the growing season for the standard variety Khazina was 132-143 days, for the variety Sochakinur - 119-136, for the variety Tailoki - 124-134, and for the variety Filial - 120-132 days, that is, the varieties Sochakinur, Filial turned out to be relatively early ripening. The vegetation period in the studied varieties when cultivated as the main crop was extended by 2-7 days compared to planting as a secondary crop.

In the studied varieties of sweet potato as the main and secondary crops during cultivation, at different times of planting seedlings, the growth, branching and foliage of plants at the beginning of the growing season (on the 30th day) differ significantly and the highest rates were observed when the seedlings were planted on April 30 as the main crop. At the same time, the length of the main stem was 31.1-34.6 cm, leafiness - 59-78 pcs. The number of lateral shoots - 3.4-4.9 pcs., main stems (29.8-30.3 cm), leafy (57-72 pieces) with side shoots (3.5-4.1 pieces). This advantage was preserved until the end of the vegetation of plants and on the 120th day it was - the length of the main stem was 158.6-191.6 cm, the number of leaves - 216-275 pieces, the number of side shoots - 13.6-15.6 pieces.

Intensive formation of the leaf surface area was observed in the studied varieties of sweet potato compared to the standard variety Khazina. The highest indicator (0.21 - 0.78 m²) was noted for the Sochakinur variety when seedlings were planted on April 30 as the main crop. And in the repeated culture, the largest leaf surface area (0.18-0.69 m²) was observed when planting seedlings on June 30.

Intensive formation of the leaf apparatus in sweet potato varieties was noted on the 30-90th day of plant vegetation, while the growth ranged from 0.10 - 0.14 to 0.25 - 0.32 m². The largest leaf surface

Table 1. Yield and marketability of sweet potato varieties at different planting dates as the main and secondary crops (2019-2021)

№	Planting seedlings		Average yield, t/ha	Compared to the standard		Of them marketable yield	
	season	timing		t/ha	%	t/ha	%
In the variety Khazina (st.)							
1		10.04 (control)	34,5	33,6	97,4	-	100,0
2		20.04	37,8	36,9	97,7	3,3	109,6
3	As the main culture	30.04	40,3	39,5	98,2	5,8	116,8
4		10.05	37,6	36,8	98,0	3,1	109,0
5		20.05	36,1	35,3	97,8	1,6	104,6
6		30.05	35,0	34,1	97,6	0,5	101,4
7		20.06	31,2	28,5	91,2	-	100,0
8	As a secondary crop	30.06	33,7	30,7	91,0	2,5	108,0
9		10.07 (control)	27,6	24,3	88,0	-3,6	88,5
			S=1,8-3,5%	LSD₀₅=2,1-2,7 t/ha			
In the variety Sochakinur							
10		10.04 (control)	46,4	45,5	98,2	-	100,0
11		20.04	49,8	49,1	98,7	3,4	107,3
12	As the main culture	30.04	53,6	53,2	99,0	7,2	115,5
13		10.05	51,5	50,8	98,8	5,1	111,0
14		20.05	50,7	49,9	98,5	4,3	109,3
15		30.05	49,4	48,6	98,5	3,0	106,5
16		20.06	36,8	33,9	92,3	-	100,0
17	As a secondary crop	30.06	40,6	37,5	92,3	3,6	110,3
18		10.07 (control)	35,1	31,5	89,8	-1,7	95,4
			S=0,9-2,5%	LSD₀₅=1,4-2,3 t/ha			
In the variety Tailoki							
19		10.04 (control)	43,8	42,8	97,8	-	100,0
20		20.04	47,9	46,9	98,0	4,1	109,4
21	As the main culture	30.04	50,2	49,4	98,5	6,4	114,6
22		10.05	48,1	47,4	98,6	4,3	109,8
23		20.05	46,4	45,6	98,2	2,6	105,9
24		30.05	45,1	44,4	98,1	1,3	103,0
25		20.06	34,7	31,8	91,7	-	100,0
26	As a secondary crop	30.06	37,9	34,8	91,8	3,2	109,2
27		10.07 (control)	32,5	28,9	89,0	-2,2	93,7
			S=1,5-2,6%	LSD₀₅=1,4-2,1 t/ha			
In the variety Filial							
28		10.04 (control)	45,2	44,2	98,0	-	100,0
29		20.04	48,5	47,7	98,4	3,5	107,3
30	As the main culture	30.04	51,8	51,2	98,8	6,6	115,1
31		10.05	49,2	48,5	98,6	4,0	108,6
32		20.05	47,8	47,0	98,4	2,6	105,8
33		30.05	47,0	46,1	98,1	1,8	104,0
34		20.06	35,5	32,5	91,6	-	100,0
35	As a secondary crop	30.06	38,0	34,9	91,8	2,5	107,0
36		10.07 (control)	33,6	29,6	88,2	-1,9	94,6
			S=1,1-2,5%	LSD₀₅=1,3-2,8 t/ha			

area per 1 hectare - 40.0-43.2 thousand m², was obtained in Sochakinur, Filial, Tailoki varieties when planting seedlings on April 30 as the main crop. At this period of planting seedlings, the highest content of chlorophyll in the leaves (460.3-482.4 mg/100 g) and the net productivity of photosynthesis (4.16 - 4.65 g/m² per day) were noted.

The lowest (30.6-34.5 thousand m²) areas of the photosynthetic apparatus were when planting seedlings on July 10 as a second crop.

The highest productivity (1129-1389 g) was noted in the varieties Sochakinur, Tailoki, Filial when cultivating the main crop, and in the secondary culture 782-809 g or 42-69 g more than the standard, component nest, color, shape and depth of eyes characteristic of the variety, and grown tubers in re-culture were immature (Fig. 3).

The highest yield (50.2-53.6 t/ha), of which 49.4-53.2 t/ha or 98.5-99.0% of the marketable yield was obtained when planting seedlings on June 30 as the main crops, while the yield increase was 6.4-7.2 tons from 1 hectare (Table 1).

In the re-culture of sweet potato varieties, a relatively high yield (37.9-40.6 t/ha) was noted when seedlings were planted on June 30. The increase, in this case, amounted to 2.5-3.6 tons from 1 hectare. The results of the analysis of variance confirmed the reliability of the yield difference ($LSD_{05}=1.3-2.8$ t/ha).

The tuber crop grown as the main crop with seedling planting on June 30, sweet potato varieties had the lowest natural weight loss and loss (3.5 - 5.0%) during storage. Therefore, the yield of healthy standard tubers after storage was 95.0 - 96.5%, and the degree of preservation was assessed as "satisfactory" and "good". During long-term storage, the quality of tubers did not change significantly. And with repeated culture, in all varieties and terms of planting seedlings, the persistence of tubers was estimated at 7.0-8.3 points, or basically "unsatisfactory" ("bad"), because the tuber crop was immature, natural decline, and other losses are significant, and that's all showed that the possibility of long-term storage is limited.

CONCLUSIONS

In the conditions of irrigated typical sierozem soils of the Samarkand region, in order to obtain a high yield (50 t/ha and more as the main crop, and 35-40 t/ha in the secondary crop), it is advisable to cultivate sweet potato varieties Sochakinur, Tailoki, Filial, plant seedlings of these varieties in the main crop on April 20-30, and in the secondary crop - on June 20-30 with a row spacing of 70 and 90 cm, according to the scheme 70x25 and 90x20 cm, with a density of 55.5-57.1 thousand plants per 1 hectare.

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