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	JIF = 1.500	SJIF (Morocco) = 7.184	OAJI (USA) = 0.350

SOI: 1.1/TAS DOI: 10.15863/TAS

International Scientific Journal

Theoretical & Applied Science

p-ISSN: 2308-4944 (print) **e-ISSN:** 2409-0085 (online)

Year: 2021 **Issue:** 08 **Volume:** 100

Published: 07.08.2021 **http://T-Science.org**

QR – Issue QR – Article

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MANAGEMENT OF GROWTH, PRODUCTIVITY OF PHOTOSYNTHESIS AND YIELD OF SWEET POTATO BY CORRECT SELECTION OF VARIETIES AND SEEDLING TIME

Abstract: *The article presents the results of studying the influence of the timing of planting seedlings on the characteristics of growth, the formation of photosynthetic potential, and the yield of new varieties of sweet potatoes. It was revealed that the timing of planting seedlings of new varieties of sweet potato significantly affects the growth and formation of plants, and the highest output of seedlings (15.0-20.7 pcs. from 1 tuber), tall (158.1-191.6 cm), branchy (13.6-15.6 pcs. from a bush) with powerful tops and an area of the photosynthetic apparatus (0.66-0.78 m2 from 1 bush) when planting seedlings on April 30. At the same time, the net productivity of photosynthesis was the highest in all studied varieties of sweet potatoes and amounted to 4.16-6.11 g/m2 per day. The yield varied in terms of planting dates and the studied sweet potato varieties from 34.5 to 53.6 t/ha. The highest yield of marketable tubers (50 t/ha and more) was obtained when planting seedlings on April 30 in the sweet potato varieties Sochakinur, Toyloki, and Filial, which was also the highest (93.5-96.5%) yield of healthy standard tubers with good biochemical composition during storage.*

Key words: *varieties, seedlings, planting, leaf surface, net productivity of photosynthesis, marketability, keeping quality, biochemical composition.*

Language: *English*

Citation: Ostonakulov, T. E., Tursunov, G. S., Amanturdiev, I. K., & Shamsiev, A. A. (2021). Management of growth, productivity of photosynthesis and yield of sweet potato by correct selection of varieties and seedling time. *ISJ Theoretical & Applied Science, 08 (100)*, 58-62.

Soi: http://s-o-i.org/1.1/TAS-08-100-12 ***Doi***: https://dx.doi.org/10.15863/TAS.2021.08.100.12

Scopus ASCC: *1100.*

Introduction

UDC:635.22:631.52:631.51

Sweet potato is the main food crop cultivated in tropical and subtropical countries of the world. Its tubers are rich in starch and sugar. China accounts for 64% of the world's gross crop.

In the leading countries of sweet potato producers, when growing this crop, research is being carried out to select varieties adapted to specific soil and climatic conditions, to create a modern resource-saving technology, to determine effective measures for planting and care that create favorable conditions for the growth and development of plants, the possibility of forming a sustainable and high yield. In our country, technologies are being developed and improved for the creation and selection of new varieties of sweet potatoes, adapted for various soil and climatic conditions of the region and their cultivation [1, p.183-184; 2, p.18-21; 3, p.46-49 ; 4, p. 11-15].

Scientists of the Republic conducted research on the study of varieties and individual elements of the technology of cultivation of sweet potatoes, as an accelerated multiplying, adaptive and high-yielding crop, given certain recommendations for the cultivation of this crop [5, p.279-279; 6, p. 353-357; 7, p. 18; 8, p. 552; 9, p.18-20]. In addition, in the State Register of the Republic of Uzbekistan since 2021 in the country, the varieties of sweet potato Khazina, GulDU, Sirdaryo, Sochakinur, Toyloki are allowed for sowing, and the variety Filial has been accepted for state testing [10, p.124]. However, research on the complex study of the elements of the cultivation and storage technology in the context of sweet potato varieties has not been carried out enough.

The purpose of the work is to study the characteristics of growth, the formation of photosynthetic potential, yield and preservation of tubers of new varieties of sweet potato at different periods of planting seedlings in the conditions of irrigated typical serozem soils of the Samarkand region, identifying promising varieties and their optimal timing of planting seedlings, ensuring the receipt of sustainable and high-quality harvest, suitable for long-term storage.

Conditions, materials and research methods.

Field experiments were carried out in 2019-2020 in the conditions of irrigated typical serozem soils of the "Barot Turdiev" farm in the Ishtikhan district of the Samarkand region. The mechanical composition of the soil is medium loamy, the depth of groundwater is 10-12 m.In the experiment, the varieties of sweet potato Khazina (standard), Sochakinur, Toyloki, Filial and the timing of planting seedlings 10,20,30.04, 10,20,30.05 and 10.06 according to the scheme 90x20 were comparatively studied. From all studied varieties of sweet potatoes, the same size of germinated seed tubers weighing 120-150 g was taken, planted to a depth of 4-5 cm in film nurseries, and the soil moisture was maintained at 65-70% for 45-48 days. After that, a ready-made seedling was obtained with 4-5 true leaves in terms of planting dates. Before planting seedlings, the ridges were covered with foil, watered, then holes were made for planting seedlings. Plot area 36 m^2, replication 4 times.

At the experimental site, all counts, observations, measurements and analyzes were carried out according to generally accepted methods and agricultural recommendations [11, p. 456; 12, p. 210]. These yield indicators were subjected to mathematical statistical processing by the dispersion method using Microsoft Exsel programs according to Dospekhov [13, p. 280-285].

In order to study the preservation of tubers of sweet potato varieties by varieties and timing of planting seedlings during harvesting, 40 kg of tubers of average weight were selected in boxes. Then the tubers were dried for 8-10 days, placed in the basement of an ordinary storehouse and monthly determined the natural loss, dry and wet rot, the formation of sprouts, as well as changes in the biochemical composition of tubers - dry matter - by the thermostatic method, starch - by specific gravity, sugar - by the cyanate method, vitamin "C" - by the method of I.K.Murri.

The degree of storage of tubers, if the total loss is up to 3%, gave 3 points, were assessed excellent; 3-5 points - good; 5-8 points - satisfactory; 8-10 points - bad; over 10 points - were rated very poorly.

Results and discussion.

The seedling yield from each seed tuber in the studied new varieties of sweet potatoes at different dates of planting seedlings ranged from 13.5 to 20.7 pieces. In all sweet potato varieties, the highest seedling yield was observed when the seedlings were planted from April 30 to May 10. With a landing date of April 10, 13.5-19.1 pieces were obtained by varieties, with a landing on April 20 - 14.5-20.2; April 30 - 15.0-20.7 pieces from 1 tuber, and with further planting dates, a decrease in seedling yield was observed.

The length of the growing season by varieties and planting dates was 122-143 days. When planting seedlings on April 10, the growing season for the sweet potato variety Khazina was 143 days, and for other varieties - 126-134 days. With further planting dates, a decrease in the growing season by 2-7 days was observed and amounted to 122-136 days.

In order to study the effect of the timing of planting seedlings of sweet potato varieties on the growth and development of plants on days 30, 60, 90 and 120 after planting, the length of the main stem, the

number of lateral shoots and the area of the leaf surface of the plants were determined in the field.

It was revealed that the timing of planting seedlings of sweet potato varieties significantly affects the length of the main stem, the number of side shoots and the area of the leaf surface of plants. On the 30th day of vegetation, the tallest plants in varieties (25.8-34.6 cm), branched (2.2-4.9 pcs.) And leaf area (0.18-0.21 m^2) were obtained when disembarking seedlings on April 30. This pattern persisted until the end of the growing season of plants and amounted, respectively, 158.1-191.6 cm, 13.6-15.6 pcs., 0.66-0.78 m^2. The superiority in plant growth and development was noted in the varieties Sochakinur, Toyloki and Filial in comparison with the standard variety Khazina. In another way, it can be noted that on the 120th day of the growing season of plants, the standard variety Khazina formed 36.6 thousand m^2 of leaf area per hectare, and in other studied varieties of sweet potatoes, it was observed at 3.9-6.6 thousand m^2. more from 1 hectare (table 1).

Determination of the net productivity of photosynthesis of new varieties of sweet potatoes at different dates of planting seedlings showed that on the 30th day (May 25-27) after planting seedlings in the field, the highest net productivity of photosynthesis in the studied varieties was observed at the time of planting seedlings on April 30 and amounted to 4.16 -4.65 g/m^2 per day. The maximum indicators of the net productivity of photosynthesis (5.89-6.11 g/m^2 per day) were noted 90 days after planting seedlings in the field. In the subsequent periods of planting seedlings and counting the net productivity of photosynthesis, they decreased.

The study of the rate of accumulation of the yield of sweet potato varieties at different times of planting seedlings showed that on the 30th day of the growing season when planting seedlings on April 10, the standard variety Khazina had 220 g of tops per bush, and the yield of tubers was 158 g, and when planted on April 20 - 225 and 165 g, April 30 - 232 and 176 g, and in subsequent periods decreases to 224-230 and 161-170, respectively, At the end of the growing season of plants, this pattern persists, and the largest mass of tops is 446 g, the yield of tubers is 1018 g per bush. when disembarking seedlings on April 30. In other studied varieties of sweet potatoes, this tendency repeated, and the highest mass of tops (524 g) and tubers (1259 g) from 1 bush was observed in the sweet potato variety Sochakinur.

The productivity and morphological characteristics of sweet potato varieties in terms of planting seedlings significantly differed, for the standard variety Khazina, the yield of tubers per bush was 987-1108 g, the number of tubers was 6.5-6.7 pieces, the average weight of one tuber per bush was 149.5 165.4 g. These indicators for new varieties of sweet potatoes are the highest, the highest productivity per bush is 1262-1389 g, the number of tubers is 8.0-8.2 pcs., The average weight of one tuber is 156.1-169.4 g in terms of planting seedlings were obtained from the Sochakinur variety.

Productivity by varieties and timing of planting seedlings ranged from 34.5-53.6 t/ha. For the standard variety Khazina, when planting seedlings on April 10, the yield was 34.5, when planting on April 20 - 37.8, when planting on April 30, the highest - 40.3 tons, and in subsequent periods the yield decreases and is 35.0-37, 6 t/ha. The largest increase in yield (5.8 t/ha or 116.8%) was obtained when planting seedlings on April 30. At the same time, the yield of marketable tubers was the highest - 39.5 t/ha or 98.2%. The other studied varieties of sweet potatoes have the highest yield (50.2-53.6 t/ha), of which the marketable yield of 49.4-53.6 t/ha or 98.5-99.0% was obtained when planting seedlings April 30. At the same time, the yield increase was 6.4-7.2 t/ha or 114.6-115.5%.

Table 1. Changes in the leaf surface area of sweet potato varieties from one hectare at different dates of planting seedlings (2020-2021 yy)

№	Dates of planting seedlings	Leaf area per hectare, thousand m^2				Increase between counts, thousand m^2		
		days of counting after disembarkation of seedlings						
		30-33-day	60-63-day	90-93-day	120-123-day	30-33/60-63	60-63/90-93	90-93/120-123
The variety Khazina (st.)								
1.	10.04	8,9	13,9	26,1	32,2	5,0	12,2	6,1
2.	20.04	8,9	15,0	29,0	34,4	6,1	14,0	5,4
3.	30.04	9,9	16,1	31,6	36,6	6,2	15,5	5,0
4.	10.05	9,4	15,5	30,0	36,1	6,1	14,5	6,1
5.	20.05	9,4	15,0	29,0	35,5	5,6	14,0	6,5
6.	30.05	8,9	14,4	28,3	33,3	5,5	13,9	5,0
The variety Sochakinur								
7.	10.04	8,9	16,7	35,5	41,6	7,8	18,8	6,1

8.	20.04	11,1	17,8	35,5	42,1	6,7	18,7	6,6
9.	30.04	11,7	18,9	36,6	43,2	7,2	17,7	6,6
10.	10.05	10,5	18,3	36,1	42,1	7,8	17,7	6,0
11.	20.05	10,5	17,2	35,5	41,6	6,7	17,3	6,1
12.	30.05	9,4	16,7	34,4	40,5	7,3	17,4	6,1
The variety Toyloki								
13.	10.04	9,4	15,0	32,2	37,7	6,6	17,2	5,5
14.	20.04	9,4	16,7	33,3	38,9	7,3	16,6	5,6
15.	30.04	10,5	16,7	34,4	40,5	6,2	17,7	6,1
16.	10.05	9,9	15,5	33,9	40,0	5,6	18,4	6,1
17.	20.05	9,9	15,5	33,3	39,4	5,6	17,8	6,1
18.	30.05	9,4	14,4	29,9	34,4	5,0	15,5	4,5
The variety Filial								
19.	10.04	9,4	15,5	33,3	40,0	6,1	17,8	6,7
20.	20.04	9,9	16,7	34,4	41,1	6,8	17,7	6,7
21.	30.04	9,9	17,8	35,5	41,6	7,9	17,7	6,1
22.	10.05	9,9	16,7	35,0	40,5	6,8	18,3	5,5
23.	20.05	9,4	16,7	34,4	40,0	7,3	17,7	5,6
24.	30.05	9,4	14,4	31,2	37,7	5,0	16,8	6,5

In order to determine the preservation of tubers of new varieties of sweet potatoes at different dates of planting seedlings, during harvesting, 40 kg of medium-sized tubers were harvested, collected in boxes, after drying for 8-10 days, they were placed in the basement of a conventional storehouse and monthly during storage in November. December, January and February - the total losses were determined, that is, natural loss, dry and wet rot, sprouting, as well as changes in the biochemical composition of tubers. After storage, the yield of healthy standard tubers during storage was established.

It was revealed that the natural loss by varieties and planting dates of seedlings varied from 3.5 to 6.6%, and the total loss from 3.5 to 7.3%. After storage, the yield of healthy standard tubers was 92.5-96.5%. The highest degree of tuber keeping quality (3.5-5.0 points) was noted in the sweet potato varieties Filial, Toiloki and Sochakinur when the seedlings were planted on April 30. At this time of planting seedlings, the standard variety Khazina also had the lowest total loss of tubers (6.5 points). With early or late planting of seedlings, the yield of healthy standard tubers decreases by 0.2-1.7% during long-term storage.

It can be noted that planting seedlings at the optimal time (April 30) contributes to obtaining the highest (93.5-96.5%) yield of healthy standard tubers during storage.

The study of changes in the biochemical composition of tubers of new varieties of sweet potatoes at different dates of planting seedlings during storage by months - in November, December, January and February, showed that the content of dry matter, starch, sugar, protein and ascorbic acid is significantly different. During storage in November-January, biochemical parameters did not change sharply, and in February a significant decrease in dry matter, starch, sugar, protein and vitamin "C" was observed. The highest qualities with a biochemical composition, that is, dry matter content - 21.3-23.3%, starch - 13.3-14.1%, sugar - 5.3-5.5%, protein - 1.8- 2.0%, vitamin "C" - 6.7-12.6 mg /%, were obtained at the time of planting seedlings of new varieties of sweet potatoes on April 30.

Conclusions.

The timing of planting seedlings of new varieties of sweet potato significantly affects the growth and formation of plants, and at the same time, the highest seedlings yield (15.0-20.7 pcs. from 1 tuber), tall (158.1-191.6 cm), branchy (13 , 6-15.6 pcs. from a bush) with powerful tops and leaf area (0.66-0.78 m^2 from 1 bush) when planting seedlings on April 30. At the same time, the net productivity of photosynthesis was the highest in all studied varieties of sweet potatoes and amounted to 4.16-6.11 g/m^2 per day. The yield varied in terms of planting dates and the studied sweet potato varieties from 34.5 to 53.6 t/ha. The highest yield of marketable tubers (50 t/ha and more) was obtained when planting seedlings on April 30 in the sweet potato varieties Sochakinur, Toyloki and Filial, which was also the highest (93.5-96.5%) yield of healthy standard tubers with good biochemical composition during storage.

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