

Influence Of Different Seeding Times On The Yield Of Shalot Onion

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Abstract. The article notes that in soil-climatic conditions of Andijan region under different planting dates of 45-day seedlings of onion-shallot variety Sprint marketable yield was at the planting date of February 10 (control) - 48.9 t/ha, February 20 - 40.4 t/ha, March 1 - 32.5 t/ha and March 10 - 25.0 t/ha, as well as the share of marketable yield in the total yield was 87.0; 86.7; 83.5 and 79.1%, respectively.

Key words: shallot, number of leaves, leaf length, leaf diameter, onion head weight, total yield, commodity yield

Turli Ekish Muddatlarini Shalot Piyozni Hosildorligiga Ta'siri

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Annotatsiya. Maqolada Andijon viloyati tuproq-iqlim sharoitida shalot piyozining Sprint navini 45 kunlik ko'chatlar turli ekish muddatlarida tovarbop hosildorligi 10 fevral (nazorat) ekish muddatida – 48,9 t/ga, 20 fevralda – 40,4 t/ga, 1 martda – 32,5 t/ga va 10 martda – 25,0 t/ga, shuningdek, umumiy hosildagi tovarbop hosil ulushi ekish muddatlariga mos ravishda 87,0; 86,7; 83,5 va 79,1 % namoyon qilganligi keltirilgan.

Kalit so'zlar: shalot piyoz, barglar soni, barg uzunligi, barg diametri piyozboshcha vazni, umumiy hosildorlik, tovar hosildorlik.

Аннотация. В статье отмечено, что в почвенно-климатических условиях Андижанской области при разных сроках посадки 45-дневных рассады сорта лука-шалота Спринт товарная урожайность составила при сроке посадки 10 февраля (контроль) – 48,9 т/га, 20 февраля – 40,4 т/га, 1 марта – 32,5 т/га и 10 марта – 25,0 т/га, а также доля товарной урожайности в общем урожае составила соответственно 87,0; 86,7; 83,5 и 79,1%.

Ключевые слова: лук-шалот, количество листьев, длина листа, диаметр листа, масса луковицы, общая урожайность, товарная урожайность.

Introduction

The onion family is distributed on all continents of the globe, and includes 30 families and 650 species, but only 20-25 species are used by the world's population for food and 12 species in agriculture. Today, onion (*Allium sera* L.) is planted in 4.444 million hectares of land in the world, producing 85.8 million tons of products, of which China (871.0 thousand tons), Mali (696.0 thousand tons), Japan (528.0 thousand tons) and Korea (406.0 thousand tons) are the leading countries in the production of shallots, and they are one of the main crops in their vegetable production.

Onion species are widespread in all parts of the world, including Europe, North and South America, Australia, Asia and Africa. Therefore, the systematics, distribution and biology of the onion family have long been the focus of researchers. In this regard, shallots, which are high-yielding, disease-resistant, extremely cold-resistant and have a long shelf life, are considered promising vegetable crops. Shallots are constantly increasing in terms of area and production in world agriculture.[3], [4], [7].

However, shallots are not widely distributed in Uzbekistan, particularly in the soil and climatic conditions of the Andijan region, due to the lack of zoned varieties and the lack of scientific justification for cultivation technology. Therefore, the cultivation of shallots in the republic requires the study of foreign breeding sources, as well as research into improving some elements of cultivation technology.

Research methodology. In the field experiments, 45-day-old seedlings of the “Sprint” variety of shallots were planted on February 10, February 20, March 1, and March 10. The studies were conducted on 20 plants in each sample, with 4 rotations, 2 rows, a plot length of 5.15 m, a calculated area of 5.6 m², and a planting scheme of 50+20/2×10. Phenological observation and biometric measurements were carried out during the research process.

Field experiments were conducted based on the methodological manuals "Methodology of conducting experiments in vegetable, berry and potato growing" [1], "Methodology of experimental work in vegetable and melon growing" [2] and "Methodical instructions for studying the onion and garlic collection" [6]. Statistical analysis of the research results was performed using the computer program "Excel 2010" and "Statistica 7.0 for Windows" using the dispersion method "Methodology of field experiments" [5] with a confidence interval of 0.95%.

Research results. When determining the number of leaves per bulb of the Sprint shallot variety at different planting dates in the soil and climatic conditions of the Andijan region, it was determined that in 2022, at the planting date of February 10 (control) - 6.0 pieces, on March 10 - 6.0 pieces, on February 20 - 5.0 pieces, and on March 1 - 5.0 pieces, while in 2023 and 2024, respectively, at the planting date of February 20 - 8.5 and 7.8 pieces, on February 10 (control) - 7.3 and 6.9 pieces, on March 10 - 5.1 and 5.2 pieces, and on March 1 - 5.1 and 4.9 pieces (Table 1).

Table 1
Number of leaves per bulb of Sprint shallot variety at different planting times

Planting dates	Number of leaves per bulb, pcs.				
	2022	2023	2024	average	compared to control, %
February 10 (control)	6.0±0.09	7.3±0.11	6.9±0.10	6.7±0.08	100.0
February 20	5.0±0.09	8.5±0.13	7.8±0.11	7.1±0.09	106.1
March 1	5.0±0.07	5.1±0.08	5.2±0.08	5.1±0.06	75.9
March 10	6.0±0.08	5.1±0.08	4.9±0.07	5.3±0.05	79.6
EKF05	0.2±	0.2±	0.2	0.1	-
Sx%	3.1	2.7	2.9	1.3	-

When analyzing the average number of leaves per bulb of the Sprint shallot variety in different planting periods in the soil and climatic conditions of the Andijan region in 2022-2024, it was found that 7.1 leaves were formed during the planting period of February 20, 6.7 leaves were formed on February 10, 5.3 leaves on March 10, and 5.1 leaves on March 1.

In the Sprint variety of shallots at different planting dates, in 2022, the leaf length was 31.8 cm at the time of planting on March 1, 30.8 cm at March 10, 30.0 cm at February 20, and 28.4 cm at the time of planting on February 10. In 2023, this indicator was formed at the time of planting on February 20, 36.5 cm at the time of planting on February 10 and March 1, 31.0 cm at the time of planting on March 10, and 29.0 cm at the time of planting on March 10. Also, when the leaf length was determined in 2024, the longest leaves were observed at the time of planting on February 20 (35.1 cm), March 1 (32.5 cm), and March 10 (27.6 cm) compared to the time of planting on February 10 (29.5 cm) (Table 2).

According to the data in Table 2, when analyzing the average leaf length of the Sprint shallot variety for different planting dates for 2022-2024, it was found that compared to the control planting date of February 10 (29.6 cm), longer leaves were formed on February 20 (33.9 cm) and March 1 (31.8 cm), while on the contrary, the March 10 planting date (29.2 cm) formed leaves that were 0.4 cm shorter. When mathematically and statistically processed, the leaf length of the Sprint shallot variety in 2022-2024 was EKF05 – 1.0 cm and Sx% – 3.2 % in 2022, EKF05 – 0.9 cm and Sx% – 2.7 % in 2023, EKF05 – 0.9 cm and Sx% – 3.0 % in 2024, and EKF05 – 0.4 cm and Sx% – 1.2 % in 2022-2024.

Table 2

Leaf length of Sprint shallot variety at different planting times

Planting dates	Leaf length, cm				
	2022	2023	2024	average	compared to control, %
February 10 (control)	28.4±0.42	31.0±0.46	29.5±0.43	29.6±0.35	100.0
February 20	30.0±0.55	36.5±0.54	35.1±0.52	33.9±0.43	114.4
March 1	31.8±0.47	31.0±0.46	32.5±0.48	31.8±0.36	107.3
March 10	30.8±0.40	29.0±0.43	27.6±0.41	29.2±0.29	98.5
EKF05	1.0	0.9	0.9	0.4	-
Sx%	3.2	2.7	3.0	1.2	-

When determining the number of bulbs in the shallot bulb at different planting dates of the Sprint variety, it was found that in 2022, the number of small bulbs (5-15 g) was 3 in all planting dates, in 2023, 2 in the planting dates of February 10 (control) and February 20, 2 in the planting dates of March 1 and March 10, and in 2024, 2 in the planting dates of February 10 (control), February 20 and March 1, and 3 in the planting date of March 10. The number of medium-weight bulbs (15-30 g) was 4 in the planting date of February 20, 3 in the planting date of February 10, 2 in the planting date of March 1, and 1 in the planting date of March 10 in the control planting date of February 20 in 2022-2024. It was found that the number of large (31 g <) bulbs per onion was 2 in all planting periods during 2022-2024 (see Figure 4.13).

The weight of a small bulb (5-15 g) of the Sprint shallot variety was determined in 2022 at the February 10 (control) planting date - 11.1 g, compared to small bulbs of 1.6-3.3 g formed on February 20 (11.1 g), March 1 (8.7 g) and March 10 (7.8 g). The average weight of bulbs (15-30 g) in the main onion was 20.7 g at the February 10 planting date, compared to small bulbs of 1.6-4.0 g formed on February 20 (19.1 g), March 1 (18.4 g) and March 10 (16.7 g). It was also found that this year, the largest bulbs (31 g <) were planted on February 10 - 45.8 g, on February 20 - 43.5 g, on March 1 - 40.0 g, and on March 10 - 36.3 g (Figure 1).

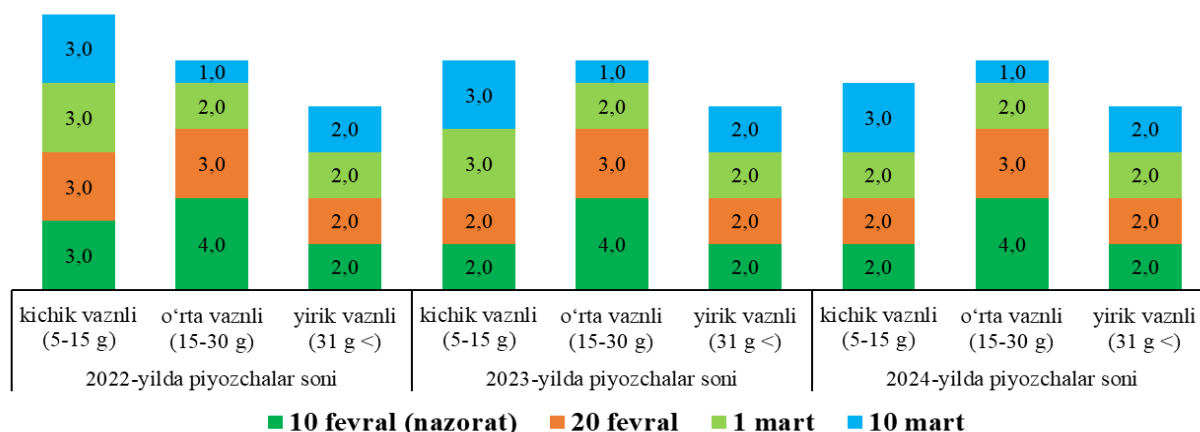


Figure 1. Number of bulbs per bulb of Sprint shallot variety at different planting times, pcs.

According to the data in Figure 2, in 2023, the weight of small bulbs (5-15 g) at the planting date of February 10 (control) was 11.3 g, compared to the planting dates of February 20 (9.4 g), March 1 (8.1 g) and March 10 (7.9 g) with 1.9; 3.2 and 3.4 g of small bulbs, respectively. It was also found that the average weight of bulbs (15-30 g) in the onion was 21.1 g at the planting date of February 10 (control), 18.9 g on February 20, 17.2 g on March 1 and 16.8 g on March 10. The largest weight (31 g <) of onion bulbs in the February 10 (control) planting period was 46.7 g, compared to 3.7; 9.5 and 10.1 g of small bulbs in the February 20 (43.0 g), March 1 (37.2 g) and March 10 (36.6 g) planting periods, respectively.

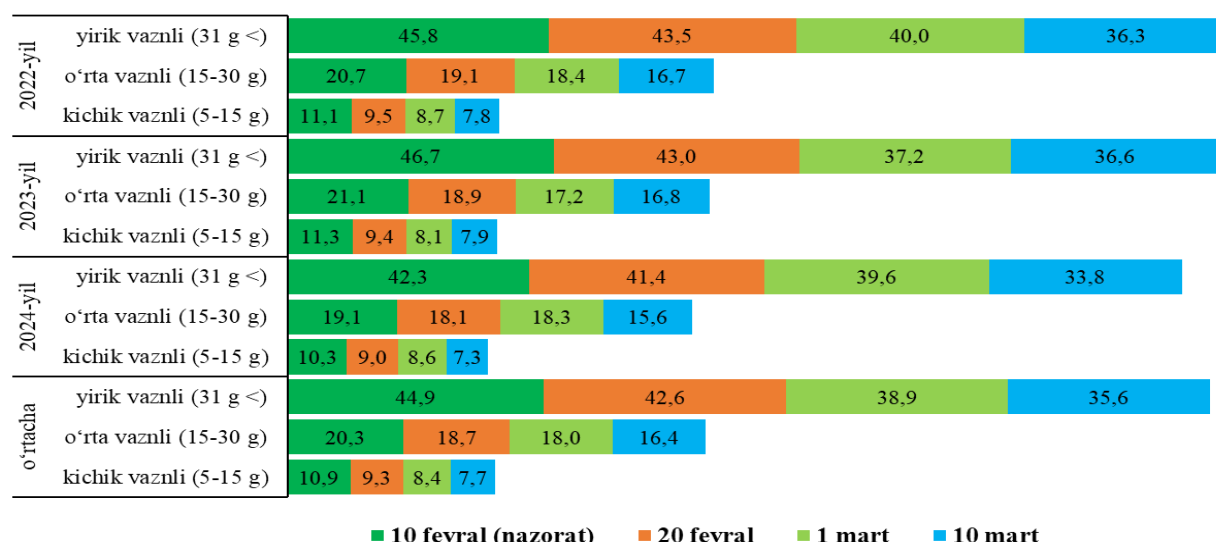


Figure 2. Weight of one shallot bulb at different planting times of the Sprint shallot variety, g

When analyzed in 2024, small-weight (5-15 g) bulbs in the Sprint shallot variety were 10.3 g at the February 10 (control) planting date, 9.0 g at February 20, 8.6 g at March 1, and 7.3 g at March 10, while medium-weight (15-30 g) bulbs were formed at 19.1; 18.1; 18.3 and 15.6 g, respectively, according to the planting dates. Large-weight (31 g <) bulbs were formed at the February 20 (41.4 g), March 1 (39.6 g) and March 10 (33.8 g) planting dates in 2024, compared to the February 10 (42.3 g) control planting date, 0.9; 2.7 and 8.5 g were found to be small. Also, when analyzing the average weight of one bulb for 2022-2024, it was found that small-weight (5-15 g) bulbs were formed by 1.6; 2.5 and 3.2 g smaller at the planting dates of February 20 (9.3 g), March 1 (8.4 g) and March 10 (7.7 g) compared to the February 10 (control) date (10.9 g), respectively. The average weight of bulbs (15-30 g) in the main bulb was 20.3 g at the planting date of February 10, compared to 1.6 g at the planting date of February 20 (18.7 g), 2.3 g at the planting date of March 1 (18.0 g) and 3.9 g at the planting date of March 10 (16.4 g). When analyzing large (<31 g) bulbs, it was found that the largest bulbs were found during the planting period of February 10 (44.9 g), while bulbs with a smaller weight of 2.3-9.3 g were formed during the planting periods of February 20 (42.6 g), March 1 (38.9 g), and March 10 (35.6 g).

When determining the weight of small bulbs (5-15 g) in the shallot variety Sprint at different planting dates, it was found that in 2022, at the planting date of February 10 (control), it was 45.8 g, on February 20 – 43.5 g, on March 1 – 40.0 g and 36.3 g, while in 2023, corresponding to the planting dates, it was 46.7; 43.0; 37.2 and 36.6 g, and in 2024 – 20.5; 18.0; 17.1 and 21.9 g. When analyzing the average bulb weight (15-30 g) in onions, it was found that in 2022, at the planting date of February 10 (control), it was 82.8 g, on February 20 – 57.2 g, on March 1 – 36.9 g and on March 10 – 16.7 g, and in 2023, it was 84.4; 36.6; 34.4 and 16.8 g and 75.4; 54.4; 36.5 and 15.6 g, respectively (Figure 3).

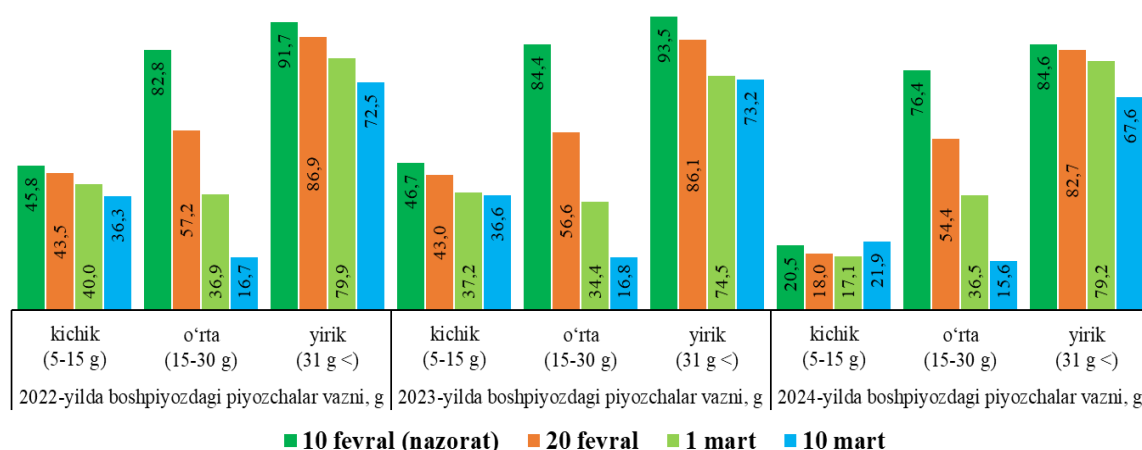


Figure 3. Weight of small, medium and large bulbs in the head of the Sprint shallot variety at

different planting dates, g

According to the data in Figure 3, the weight of large bulbs in onions (30 g <) at the planting date of February 10 in 2022 was 91.7 g, compared to the planting dates of February 20 (86.9 g), March 1 (79.9 g) and March 10 (72.5 g) - 4.8; 11.8 and 19.2 g less (respectively). In 2023, the weight of large bulbs in onions at the planting dates of February 20 (86.1 g), March 1 (74.5 g) and March 10 (73.2 g) - 7.4; 19.0 and 20.3 g less than the planting date of February 10 (control) - 93.5 g. Also, in 2024, large bulbs were formed at the February 10 (control) planting date (84.6 g), compared to 1.9-17.0 g less bulbs at the February 20 (82.7 g), March 1 (79.2 g), and March 10 (67.6 g) planting dates.

The weight of the shallot Sprint variety bulb at different planting dates was determined in 2022, while the control was 207.9 g at the planting date of February 10, compared to 35.4; 65.1 and 95.2 g less at the planting dates of February 20 (172.5 g), March 1 (142.8 g) and March 10 (112.7 g), respectively. Also, in 2023, the planting dates of February 20 (161.5 g), March 1 (133.1 g) and March 10 (113.8 g) showed a bulb weight of 39.1; 67.5 and 86.8 g less than the control date of February 10 (200.6 g) (respectively). In 2024, compared to the February 10 (control) planting date (181.5 g), the February 20 (155.1 g) planting date yielded 26.4 g, the March 1 (132.8 g) planting date yielded 48.7 g, and the March 10 (105.0 g) planting date yielded 76.5 g (Table 2).

Table 2
Weight of shallots of Sprint variety at different planting times

Planting dates	Onion weight, g				
	2022	2023	2024	average	compared to control, %
February 10 (control)	207.9±3.06	200.6±2.95	181.5±2.67	196.7±2.34	100.0
February 20	172.5±3.15	161.5±2.38	155.1±2.28	163.0±2.11	82.9
March 1	142.8±2.10	133.1±1.96	132.8±1.95	136.2±1.56	69.3
March 10	112.7±1.45	113.8±1.68	105.0±1.55	110.5±1.09	56.2
EKF05	5.5	4.2	4.3	2.4	-
Sx%	3.4	2.8	3.0	1.6	-

According to the data in Table 2, when analyzing the average bulb weight of the Sprint shallot variety for 2022-2024 at different planting dates, it was found that the average bulb weight at the February 10 (control) planting date was 196.7 g, while smaller bulbs were found at the February 20 (163.0 g), March 1 (136.2 g), and March 10 (110.5 g) planting dates. Also, when mathematically and statistically processed, the weight of the Sprint variety of shallots at different planting times was EKF05 in 2022 - 5.5 g and Sx% - 3.4 %, EKF05 in 2023 - 4.2 g and Sx% - 2.8 %, EKF05 in 2024 - 4.3 g and Sx% - 3.0 %, and the average EKF05 for 2022-2024 was 2.4 g and Sx% - 1.6 %.

When the total yield of the Sprint shallot variety at different planting dates was determined in 2022, it was found that the February 10 (control) planting date was 59.4 t/ha, and compared to this planting date, February 20 (49.3 t/ha), March 1 (40.8 t/ha) and March 10 (32.2 t/ha) yielded 10.1; 18.6 and 27.2 t less yield per unit area, respectively. Also, in 2023, the February 20 (46.1 t/ha), March 1 (38.0 t/ha) and March 10 (32.5 t/ha) planting dates showed a total yield of 11.2; 19.3 and 24.8 t less than the control February 10 (57.3 t/ha) planting date (respectively). In 2024, the total yield of the Sprint shallot variety at different planting dates was 51.8 t/ha at the control planting date of February 10, compared to 7.5-21.8 percent lower total yield per unit area at the planting dates of February 20 (44.3 t/ha), March 1 (37.9 t/ha), and March 10 (30.0 t/ha) (Table 3).

Table 3
Total yield of Sprint shallot variety at different planting dates

Planting dates	Total yield, t/ha				
	2022	2023	2024	average	compared to control, %
February 10 (control)	59.4±0.87	57.3±0.84	51.8±1.06	56.2±0.69	100.0

February 20	49.3±0.73	46.1±0.68	44.3±0.90	46.6±0.61	82.9
March 1	40.8±0.60	38.0±0.56	37.9±0.56	38.9±0.46	69.2
March 10	32.2±0.47	32.5±0.48	30.0±0.44	31.6±0.36	56.2
EKF05	1.3	1.4	1.7	0.6	-
Sx%	2.8	3.3	4.2	1.5	-

According to the data in Table 3, the average total yield of the Sprint shallot variety at different planting dates for 2022-2024 was determined for the earliest planting date of February 10 (control) (56.2 t/ha), while the February 20 (46.6 t/ha), March 1 (38.9 t/ha) and March 10 (31.6 t/ha) periods showed a yield of 17.1-43.8% or 9.6; 17.3 and 24.6 t per unit area. Also, when mathematically and statistically processed, the total yield indicators of the Sprint shallot variety at different planting dates were: EKF05 in 2022 - 1.3 t/ha and Sx% - 2.8%, EKF05 in 2023 - 1.4 t/ha and Sx% - 3.3%, EKF05 in 2024 - 1.7 t/ha and Sx% - 4.2 t/ha, and the average EKF05 for 2022-2024 was 0.6 t/ha and Sx% - 1.5%.

When calculating the marketable yield of the Sprint shallot variety at different planting dates, in 2022, the marketable yield was 49.9 t/ha at the February 10 (control) planting date, 41.2 t/ha at the February 20 planting date, 33.4 t/ha at the March 1 planting date, and 25.5 t/ha at the March 10 planting date. This means that the share of marketable yield in the total yield, depending on the planting dates, was (respectively) 84.0; 83.6; 81.9 and 79.2%, while in 2023, during the sowing period of February 10 (control), it was 50.8 t/ha, on February 20 – 40.8 t/ha, on March 1 – 31.1 t/ha and on March 10 – 25.7 t/ha, and the share of marketable yield in the total yield was (respectively) 88.7; 88.5; 81.8 and 79.1%. Also, in 2024, during the sowing period of February 10 (control), it was 46.0 t/ha, on February 20 – 39.2 t/ha, on March 1 – 33.0 t/ha and on March 10 – 23.8 t/ha, and the share of marketable yield in the total yield was (respectively) 88.8; 88.5; 87.1 and 79.3% (Table 4).

Table 4
Marketable yield of Sprint shallot variety at different planting dates

Planting dates	Marketable yield, t/ha					Share of marketable crops in total crops, %
	2022	2023	2024	average	control, %	
February 10 (control)	49.9±0.73	50.8±1.04	46.0±0.68	48.9±0.54	100.0	87.0
February 20	41.2±0.61	40.8±0.83	39.2±0.58	40.4±0.48	82.6	86.7
March 1	33.4±0.49	31.1±0.63	33.0±0.49	32.5±0.38	66.5	83.5
March 10	25.5±0.52	25.7±0.38	23.8±0.35	25.0±0.32	51.1	79.1
EKF05	1.4	1.7	1.1	0.4	-	-
Sx%	3.8	4.6	3.2	1.1	-	-

According to the data in Table 4, the marketable yield of the Sprint shallot variety at different planting dates was close to the indicators in 2022-2024, and it was determined that the marketable yield was formed at the February 10 (control) planting date - 48.9 t/ha, at the February 20 planting date - 40.4 t/ha, at the March 1 planting date - 32.5 t/ha, and at the March 10 planting date - 25.0 t/ha. This year, the share of marketable yield in the total yield was 87.0; 86.7; 83.5 and 79.1%, respectively, by planting dates.

When mathematically and statistically processed, the marketable yield indicators of the Sprint variety at different planting dates were EKF05 in 2022 - 1.4 t/ha and Sx% - 3.8%, EKF05 in 2023 - 1.7 t/ha and Sx% - 4.6%, EKF05 in 2024 - 1.1 t/ha and Sx% - 3.2 t/ha, and the average EKF05 for 2022-2024 was 0.4 t/ha and Sx% - 1.1%.

CONCLUSION

1. It was found that 7.1 leaves were formed per bulb of shallots when planted on February 20, 6.7 leaves on February 10, 5.3 leaves on March 1, and 5.1 leaves on March 1.
2. The length of shallot leaves at different planting dates was determined to be longer than the control planting date of February 10 (29.6 cm), while the planting dates of February 20 (33.9 cm) and March 1 (31.8 cm) were determined to be shorter than the control planting date of February 10 (29.2 cm), while the planting date of March 10 (29.2 cm) was determined to be shorter than the control planting date of February 10 (29.6 cm).

3. The weight of one small onion (5-15 g) in the control was 10.9 g in the planting period of February 10, 9.3 g in the planting period of February 20, 8.4 g in the planting period of March 1 and 7.7 g in the planting period of March 10, medium-weight onions (15-30 g) in the planting period of February 10 were 20.3 g, in the planting period of February 20 - 18.7 g, in the planting period of March 1 - 18.0 g and in the planting period of March 10 - 16.4 g, and large-weight onions (31 g <) in the planting period of February 10 - 44.9 g, in the planting period of February 20 - 42.6 g, in the planting period of March 1 - 38.9 g and in the planting period of March 10 - 35.6 g.
4. The weight of small bulbs (5-15 g) in the control onion at different planting dates was 25.5 g at the planting date of February 10, 21.7 g at the planting date of February 20, 22.5 g at the planting date of March 1 and 23.0 g at the planting date of March 10, medium-weight bulbs (15-30 g) at the planting date of February 10 were 81.2 g, 56.1 g at the planting date of February 20, 35.9 g at the planting date of March 1 and 16.4 g at the planting date of March 10, and large-weight bulbs (31 g <) at the planting date of February 10 were 89.9 g, 85.2 g at the planting date of February 20, 77.9 g at the planting date of March 1 and 71.1 g at the planting date of March 10.
5. The weight of a large shallot bulb at different planting dates was 196.7 g at the February 10 (control) planting date, while smaller bulbs were found at the February 20 (163.0 g), March 1 (136.2 g), and March 10 (110.5 g) planting dates.
6. The highest total yield of shallots at different planting dates was determined for the earliest planting date of February 10 (control) (56.2 t/ha), while the dates of February 20 (46.6 t/ha), March 1 (38.9 t/ha) and March 10 (31.6 t/ha) showed a yield of 17.1-43.8% or 9.6; 17.3 and 24.6 t per unit area.
7. The marketable yield of shallots at the planting date of February 10 (control) was 48.9 t/ha, on February 20 – 40.4 t/ha, on March 1 – 32.5 t/ha and on March 10 – 25.0 t/ha, and the share of marketable yield in the total yield was 87.0; 86.7; 83.5 and 79.1%, respectively, for the planting dates.

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