

Effect of seedling thickness on stem height and number of leaves of oil sunflower cultivars

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Abstract. This paper reports on the effect of seedling thickness on stem height and leaf number of oilseed sunflower. According to him, the local Dilbar (st) variety compared to foreign Buzuluk and Rodnik varieties, when the seedling thickness was set at 50, 60, and 70,000 per hectare, the plant was superior in terms of height and number of leaves, but when the number of seedlings was increased to 80,000, the growth slowed down and reached an average of 226.4 cm. and while the height of the plant in the Buzuluk variety is average, it was determined that the height of the plant in the Rodnik variety is high, i.e. 234.3 cm, at the thickness of 80,000 seedlings per hectare. **Keywords.** sunflower, seed, planting rate, fertilizer rate, soil moisture, variety, hybrid, mulch.

1 Introduction

The morphological indicator of the high potential that determines the efficiency of plants, in particular, the biometric indicators of sunflower: photosynthetic organs (leaves) and their number, as well as plant growth indicators, is directly related to the size of the diameter of the basket. However, it should be recognized that linear indicators of plant growth are not always related to yield, sometimes this correlation can be negative [1].

The homeland of the sunflower was considered to be Mexico and Peru, but based on the documents, it was found to be North America-Canada. The description of sunflower by botanists was first written by Lobel and called it "Sunflower" [2].

Scientists say that the size of the baskets of Umnik and Master varieties in the experiment was 19.3-19.2 cm when 20,000 seeds were planted per hectare, the productive area of the basket was 298.7 and 295.3 square cm, and the number of seeds in the basket was 1541 and 1506 [3-5].

Sunflowers are planted with a width of 60, 70 centimeters between rows. Planting of short (0.8-1.2 meters) early ripening varieties planted in Angiz at a thickness of 70,000 bushes per hectare gave good results [6].

Sunflowers are planted in one row with a row spacing of 70 cm. When the planting scheme is 70x20,70x30, the seedling thickness is 42 and 56 thousand units per hectare, respectively. As a repeat crop, it can be planted after winter barley and wheat [7].

Yields of sunflower varieties varied depending on the sowing period, and the highest yields were observed in the Dilbar variety (36.5 q/ha), 11.3 q/ha in the Jahangir compared to control variety, 7.9 q/ha in the Rodnik variety, and was 2.0 q/ha higher than variety of

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Nowruz. During the sowing period on June 20, the oil content of seeds in the variety "Dilbar" was 1.1-1.2% higher than other varieties studied in the experiment and late sowing, and oil yield per hectare was 204-1346 kg/ha more [8-10].

2 Study area

In this research, field experiments were conducted at the experimental farm of the State Unitary Enterprise "Center for Innovative Development and Consulting in Agriculture" under the Tashkent State Agrarian University. The soil of the experimental field at the experimental station is a typical gray soil that is irrigated and has been irrigated since ancient times.

The color of this soil is gray-gray soil, weakly eroded. The total nitrogen in the soil is between 0.160%, 0.170% phosphorus, 1.90% potassium, mobile phosphorus 17-46, mobile potassium 380-540 mg/kg and water-soluble mobile form of potassium around 393-482 mg/kg. The amount of humus in the soil of the studied experimental area is 1.89% in the 0-15 cm layer and 1.73% in the 15-27 cm layer, which decreases depending on the lower layers.

3 Materials and methods

Scientific research work was conducted in 2022 in the fields of experimental scientific research and educational experimental farm of Tashkent State Agrarian University. Oilseed sunflower in a field experiment Buzuluk, Rodnik and Dilbar, varieties with 12 variants, were planted in four repetitions. The area occupied by each variant is 28 m², of which 14 m² is taken into account, and the total area occupied by the experiment is 0.13 ha.

Based on the goals and objectives of the experiments, phenological observations and calculations were carried out in Dilbar (control), Buzuluk and Rodnik varieties of oilseed sunflower.

The Dilbar variety is a breeding variety of the Oil and Fiber Crops Experimental Station of Uzbekistan. Origin: obtained from (HS-H-45-Serbia) samples by single and group selection method. Since 2013, agricultural crops for planting in the main and repeated periods on irrigated lands in the Republic have been included in the State Register.

The average height of the plant is 170 cm. The leaf is heart-shaped, moderately hairy. The basket is dense, 26-29 cm in diameter. The average weight of 1000 grains is 80.0-85.0 g. Early morning variety. It is done in 95-100 days in Tashkent region. The average seed yield in the main period is 33.1 q/ha.

The variety Ertapishar was created by cross-breeding between R453 and Ataman intervarietal hybrid in 1993-2001 at the All-Union Scientific Research Institute of Oilseeds (BMEITI) Sunflower Breeding Department. Vegetation period is 80-85 days. It is able to provide seed yield of 3.3 t/ha. The oil content in the seed is up to 54%. The height of the plant is 170-180 cm. The recommended planting density during the harvest period is up to 45,000 pieces/ha. The average diameter of the basket is 16-21 cm, the plant thickness of 60-70 thousand pieces/ha is considered acceptable. The weight of 1000 seeds is 55-65 grams.

The Rodnik (R453) variety is the first variety created by Borodin Sergey Georgievich, Surovkin Vladimir Nikolayevich and others at the sunflower variety selection department of the All-Union Scientific Research Institute of Oil Crops (BMEITI). Vegetation period is 77-82 days. The height of the plant is 170-190 cm. The amount of oil in the seed is up to 50-52%. The recommended planting density during harvest is 55,000 unq/ha as a main crop and 55,000 unq/ha as a repeat crop. Productivity 3.1-3.3 t/ha. 1000 seeds weigh 60-70 grams.

4 Results and discussion

Sunflower varieties were planted in the experimental field on April 6 as the main crop in spring. The stem height and number of leaves of oilseed sunflower cultivars were determined by phase.

In the first option, in which 50,000 seedlings of the Dilbar (st) variety were planted per hectare in the phase of 6-8 leaves, the height of the stem of the plant was 90.1 cm, and it was found to be lower than the options in which the number of seedlings was increased by 10,000. In the options where 70,000 and 80,000 seedlings were placed per hectare, it was observed that the height of the stem of the plant was higher than 94 cm.

Compared to Rodnik and Dilbar (st) varieties, the stem of the Buzuluk variety had a lower development in the phase of 6-8 leaf formation. In the fourth option, with a planting thickness of 80,000 pieces per hectare, the sunflower stem is 88.4 cm higher than the first option, 10.2 cm higher than the second option, 6.7 cm higher than the third option, and 2.8 cm higher than the third option.

This law was repeated in the Rodnik variety, it was found that sunflower stalks grow 2.4-8.6 cm lower in variants with an increased number of seedlings compared to variants with a number of seedlings of 50-60 thousand per hectare. Among the varieties, Dilbar (st) variety was observed to grow taller in the initial phase (Table 1).

Table 1. Effect of seedling thickness on stem height and number of leaves of oil sunflower cultivars during growth phases.

Options	Varieties	Sowing rate, 1,000 pieces/ha	Phases							
			6-8 leaf formation	Initial		Branching		Flowering		Ripe ning
			Height of stem, cm	Height of stem, cm	Number of leaves	Height of stem, cm	Number of leaves	Height of stem, cm	Number of leaves	Number of leaves
1	Dilbar (st)	50	90.1	119.1	18.3	137.0	24.0	188.5	25.7	32.0
2		60	92.4	122.8	18.2	143.3	24.1	191.6	21.8	33.4
3		70	94.2	123.9	19.3	145.6	25.3	199.8	28.9	35.2
4		80	94.8	128.9	19.9	147.6	26.2	219.3	29.4	38.1
5	Buzuluk	50	78.2	100.8	16.5	113.3	23.3	179.6	27.5	29.9
6		60	81.7	109.8	16.4	121.6	23.4	180.8	28.5	30.2
7		70	85.6	116.4	17.8	128.6	24.5	198.3	29.0	30.9
8		80	88.4	125.4	17.9	134.6	26.1	209.6	29.1	30.5
9	Rodnik	50	87.6	117.5	18.0	123.0	22.5	181.8	30.6	33.6
10		60	90.9	120.9	19.4	123.6	23.1	189.7	31.4	38.3
11		70	93.8	128.2	19.9	131.3	24.6	201.5	37.9	41.5
12		80	96.2	129.5	20.9	139.6	25.1	218.3	39.1	44.2

In the stage of star formation, in the first variant with a seedling thickness of 50 thousand pieces of Dilbar (st), the height of the plant was 119.1 cm and the average number of leaves was 18.3 pieces . It became 9.8 cm high and the number of leaves increased to 19.9 pieces.

The Rodnik variety showed almost the same parameters as the Dilbar (st) variety in terms of the height of the stem and the number of leaves in it, only in the fourth variant with 80 thousand seedlings, the height of the plant increased by 0.6 cm and the number of leaves increased by 1.0.

Buzuluk variety differed from Dilbar (st) and Rodnik varieties in terms of the plant height and the number of leaves in the star formation phase. In this variety, the height of the plant was 100.8 cm and the number of leaves was 16.5 at the thickness of 50,000 seedlings per hectare . The plant height of the options with increased seedling thickness was 109.8, 116.4 and 125.4 cm, and the number of leaves was 16.4, 17.8 and 17.9. Compared to the Dilbar (st) variety, the plant height is 19.7, 13, 7.5 and 3.5 cm lower, and the number of leaves in the plant is 1.8, 1.8, 1.5 and 2.0 less. In the fourth option, where the number of seedlings is 80,000 units per hectare, it was observed that the height of the plant was high in all varieties of the experiment.

In the tillering phase, plants grew rapidly in all variants of the Dilbar (st) variety, and the stem was taller than the Buzuluk and Rodnik varieties. At the thickness of 50,000 seedlings per hectare, the height of the plant was 137.0 cm and the number of leaves was 24.0. In the increased options, the seedling thickness was 143.3, 145.6 and 147.6 cm, and the number of leaves was 24.1, 25.3, 26.2. In this phase, the Rodnik variety was 14.0, 19.7, 14.3 and 8.0 cm lower than the Dilbar variety in all options, and the number of leaves was 1.5, 1.0, 0.7 and 1.1 less.

The height of the plant was 113.3 cm, and the number of leaves was 23.3 at the thickness of 50 thousand saplings of the Buzuluk variety per hectare. In the second, third and fourth options, where the thickness of the seedling was thickened, the height of the plants was 8.3, 15.3 and 21.3 cm, and the number of leaves also increased. But the Buzuluk variety ranked last in all indicators compared to the Rodnik and Dilbar (st) varieties. This pattern was also repeated in the flowering phase (Figure 1).

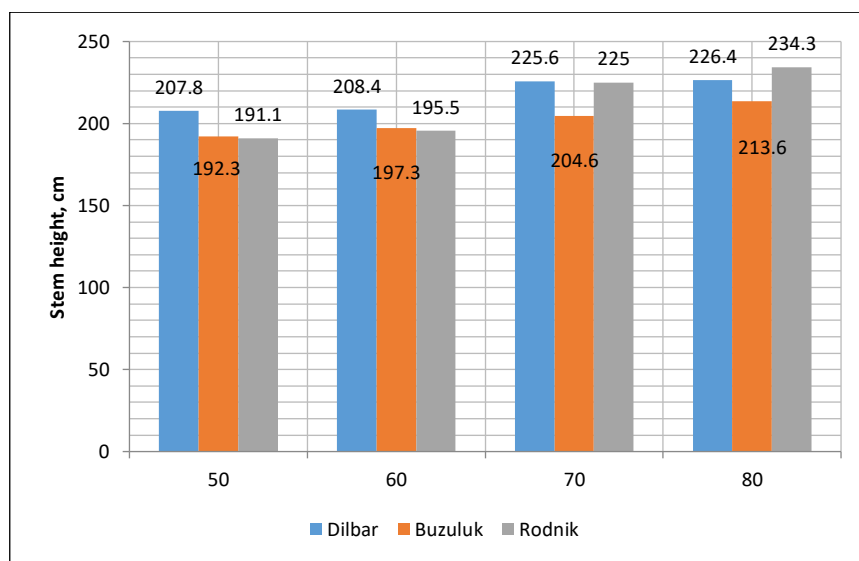


Fig. 1. Effect of seedling thickness on stem height of oil sunflower cultivars.

In the ripening phase, the Dilbar (st) variety was superior to the Buzuluk and Rodnik varieties in terms of plant height and number of leaves at a thickness of 50, 60, 70 thousand seedlings per hectare. tall and the number of leaves was found to be 6.1 more. The variety of Buzuluk has shorter stems and the number of leaves in comparison to the varieties Dilbar (st) and Rodnik.

5 Conclusions

The local Dilbar (st) variety is superior in terms of plant height and number of leaves compared to the foreign Buzuluk and Rodnik varieties when the seedling thickness is set at 50,60 and 70,000 pieces per hectare, but when the number of seedlings is increased to 80,000 pieces, its growth slows down and its average height is 226.4 cm. The height of the plant in the Buzuluk variety is average, while the height of the plant in the Rodnik variety is proven to be high, i.e. 234.3 cm, at the thickness of 80 thousand seedlings per hectare.

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