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PHOTOSYNTHETIC ACTIVITY OF SUNFLOWER CULTIVARS IN DIFFERENT SOWING SCHEMES

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ABSTRACT

The main way to increase the yield of sunflower is to grow modern early-ripening varieties adapted to the soil conditions of the region for each region. In this scientific article, the main elements of the technology of cultivation of oil sunflower as a repeated crop of high-yielding early-ripening varieties have been developed. Sunflower was planted as a repeat crop after wheat, and when the planting schemes were used correctly, increased leaf area had a positive effect on yield. As the feeding area increased, the number of leaves increased and the highest value was observed in the planting scheme of 70x35–1. Dilbar variety of sunflower produced more leaves than all three cultivars in all planting schemes in terms of leaf number index due to its large leaves and high yield.

KEYWORDS

Sunflower, predecessor, economic signs, repeat, crop, scheme, oil, variety, yield, seed, seedling, early-ripening, productivity, leaf, basket.

INTRODUCTION

Sunflower oil is mainly used in food. It is yellow in color, shiny, semi-dry (Iodine number 119-144), the seed contains 29-56% oil and 15% protein. The oil contains up to 62% biologically active menolic acid, vitamins A, D, E, K, phosphatides. Sunflower oil is rich in linoleic and oleic, unsaturated fatty acids. These oils are similar in quality to olive oil. When planting sunflower as a repeated crop, it is important to make efficient use of wheat-free land, to correctly define planting schemes,

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to develop and implement intensive land use methods in order to get crops twice a year.

The level of the problem studied. According to I.D.Tkalich (2011), removing half of the leaves from the upper part of the sunflower stem at the time of basket formation caused a 72% reduction in yield, and removing leaves from the lower part reduced the yield by 23.7%. The photosynthetic productivity of the lower leaves is used for the formation of roots and stems at the beginning of the growing season, but leads to early death due to shading, diseases and drought [5, 6].

Small xeromorphic leaves in the upper and partly middle parts of the sunflower stem under severe drought conditions, the rapid death of the lower leaves can then be compensated by the reduction of the transpiration surface of the leaves in the upper part of the stem. However, the reduction of the leaf level leads to a decrease in yield [1, 2, 3].

The high productivity of plants is determined by the process of photosynthesis, movement of substances, accumulation and growth. Organic matter is formed during photosynthesis in plants. 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 productivity, sometimes this correlation can be negative.

METHODS

Experiments were carried out in 2012-2014 in the typical sierozem soil conditions of the experimental field of the Tashkent State Agrarian University " Center for Innovative Developments and Consulting in Agriculture". In the experiment, 4 sunflower varieties "Jahongir", "Rodnik", "Dilbar" and "Navroz" were planted in 4 schemes, 70x20-1; 70x25-1; 70x30-1; It was carried out in 70x35-1 planting schemes.

Placement of field experiments, calculations and observations "Methods of conducting field experiments" (5), stem height of sunflower varieties (at all stages of development), number of leaves per plant, leaf surface (A.A.Nichiporovich, 1963), feeding area determined by the effect [4, 7].

RESULTS AND DISCUSSION

The main part of the leaves enlarges only before flowering, and after flowering, the leaves of the baskets at the top of the stem grow. Leaves from 4 to 11-13 on the stem belong to the lower layer, from 12-13 to 23-25 to the middle layer, and the leaves located above belong to the upper layer.

Pulling off any healthy leaves will bring up to reduce the productivity of the plants. At the same time, the leaves in the middle and upper part of the stem are the most important in providing nutrients to the seeds at the end of the growing season.

One of the main organs of plants are leaves, which carry out the process of photosynthesis in plants and produce organic substances. Several factors affect the size of the absorptive surface of leaves, one of which is the feeding area. The formation of leaves in oil sunflower varieties can be seen in table 1.

In the years 2012-2014, the average number of leaves per plant was 23.7 in the 70x20-1 planting scheme of Jahangir control variety, 24.0 in the 70x20-1 planting scheme, 25.0 in the 70x30-1 planting scheme and 70x30-1 it was observed that 25.2 units were produced in the planting scheme. The fourth variant with a high

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feeding area of 2450 m2 produced more leaves than the variants with a small feeding area. This pattern was also repeated in the variants of Rodnik, Dilbar and Navroz varieties studied in the experiment. The number of leaves (25.2, 26.0, 29.2 and 28.1 pieces) was observed in the 70x35-1 planting scheme with a large feeding area (2450 m2) of all three varieties. Among the varieties, it was found that Dilbar and Navroz varieties produced more leaves than Rodnik and Jahangir varieties.

The results of photosynthetic activity of sunflower varieties in different planting schemes are presented in Tables 1 and 2.

According to the obtained 3-year average data, the leaf surface of one plant during the period of star formation in the control "Jahongir" variety was 2.6 thousand cm2 in the 70x20-1 planting scheme, 2.9 thousand cm2 in the 70x25-1 scheme, 3 in the 70x30-1 scheme and 3,3thousand cm2 70x35-1 scheme was found to be. It can be seen that the variants with small feeding area had less leaf surface area and higher in variants with large feeding area. In the variant with a planting schemes of 70x35-1, compared to the variants with a small planting schemes, the leaf surface was 0.3-0.7 thousand cm2 higher. This scheme was repeated in the experimental varieties "Rodnik", "Dilbar" and "Navroz".

In the fourth option in the 70x35-1 planting scheme of the "Rodnik" variety, the leaf surface of one plant was 3.4 thousand cm2, while in the 70x20-1 scheme with a small feeding area, it was determined to be 2.7 thousand cm2, and the leaf surface was 0.7 thousand cm2 less.

Compared to the fourth option in the 70x35-1 planting scheme of the "Dilbar" variety, it was found that the leaf surface was less by 0.2-0.8 thousand cm2 in the options with a small feeding area, and by 0.2-0.8 thousand cm2 in the same option of the "Navroz" variety.

According to planting schemes, the "Dilbar" variety has a higher leaf surface per plant compared to the experimental "Jahongir", "Rodnik" and "Navroz" varieties. In "Dilbar" and "Navroz" cultivars, indicators were observed close to each other, and the highest indicator in terms of leaf surface per bush was observed in the variant with planting scheme 70x-20-1 (3.8-3.6 thousand cm2/bush).

According to the data of the average three-year research results presented in the table, one hectare of land in the control variety "Jahongir" was 18.3 thousand m2/ha in the option of planting scheme 70x20-1, and 16.5 thousand m2/ha in the option of planting scheme 70x25-1, 14.2 thousand m2/ha in the option with planting scheme 70x30-1; planting scheme was 13.3 thousand m2/ha in the option of 70x35-1. Compared to the variant with the highest indicator, it was found that the leaf surface decreased to 5.0-3.2-0.9 thousand m2/ha, and the lowest indicator was observed in the planting scheme with 70x35-1.

This observed regularity was repeated in the experimental varieties "Rodnik", "Dilbar" and "Navroz". Compared to the variant with a 70x20-1 planting scheme in the "Rodnik" variety, in other planting schemes in the experiment, in the following order, It was found that it decreased to up to 5.3-3.8-1.4 thousand m2/ha, in the "Dilbar" variety 5.8-3.3-1.6 thousand m2/ha, and in "Navroz" variety to 5.5-3.1-1.4 thousand m2/ha, and the lowest indicator was observed in the planting scheme with 70x35-1.

According to the average three-year research results of the leaf surface indicators per hectare of sunflower varieties during the star phase formation period, the

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highest indicator was observed in the "Jahongir", "Rodnik", "Dilbar" and "Navroz" varieties in the variant with a planting scheme of 70x20-1 (18.3 -19.1-21.3-20.6 thousand m2/ha). It can be seen that the leaf area per plant of sunflower was higher in the 70x35-1 planting scheme, while the number of seedlings per hectare was higher in the 70x20-1 planting scheme. When comparing the differences between the varieties according to the parameters of the leaf surface per hectare, "Dilbar" and "Navroz" varieties had similar indicators, and a significant difference was observed in the "Jahongir" control variety. According to the obtained results, it was found that "Dilbar" variety had a higher leaf surface of 0.7-2.2 thousand m2/ha than "Navroz" and "Rodnik" varieties.

It was found out in the research results that when the sunflower's development period changes, its leaf surface also increases.

According to the average 3-year data obtained, the leaf surface of one plant during the flowering period varies according to the planting schemes, and the lowest indicator in the control variety "Jahongir" was observed in the variant with the planting scheme 70x20-1, 4.3 thousand cm2 /plant; 4.4 thousand cm2/bush in the option with planting scheme 70x25-1; 4.5 thousand cm2/bush in the option with planting scheme 70x30-1; In the planting scheme of 70x35-1, it was 4.6 thousand cm2/bush, and as the feeding area increases, it was found that the leaf surface exceeds 0.1 thousand cm2/bush.

Table 1

Indicators of leaf surface of oilseed sunflower cultivars during budding period according to variants (2012 - 2014)

No	Planting scheme	Varieties	Leaf surface oil of sunflower varieties according to options, (thousand cm^2/ha)				Leaf surface oil of sunflower varieties according to options, (thousand m^2/ha)			
			years				years			
			2012	2013	2014	Average	2012	2013	2014	Average
1	70x20-1	Jahangir (st)	2,6	2,7	2,5	2,6	18,3	19,0	17,6	18,3
2	70x25-1		2,9	3,0	2,8	2,9	16,5	17,1	15,9	16,5
3	70x30-1		3,0	3,1	2,9	3,0	14,2	14,7	13,8	14,2
4	70x35-1		3,3	3,4	3,2	3,3	13,3	13,8	12,9	13,3
5	70x20-1	Rodnik	2,7	2,8	2,6	2,7	19,1	19,9	18,4	19,1
6	70x25-1		3,0	3,2	3,1	3,1	16,9	18,3	17,6	17,6

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7	70x30-1		3,2	3,3	3,1	3,2	15,1	15,8	14,7	15,2
8	70x35-1		3,4	3,5	3,3	3,4	13,8	14,2	13,4	13,8
9	70x20-1	Dilbar	3,0	3,1	2,9	3,0	21,3	22,1	20,6	21,3
10	70x25-1		3,3	3,4	3,2	3,3	18,8	19,4	18,2	18,8
11	70x30-1		3,6	3,7	3,5	3,6	17,1	17,6	16,6	17,1
12	70x35-1		3,8	3,9	3,7	3,8	15,5	15,9	15,1	15,5
13	70x20-1	Navroz	2,9	3,0	2,8	2,9	20,6	21,3	19,9	20,6
14	70x25-1		3,2	3,3	3,1	3,2	18,2	18,8	17,6	18,2
15	70x30-1		3,5	3,6	3,4	3,5	16,5	17,1	16,0	16,5
16	70x35-1		3,7	3,8	3,6	3,7	15,1	15,5	14,6	15,1

Table 2

Indicators of leaf surface of oilseed sunflower cultivars during flowering period according to variants (2012 - 2014)

No	Planting scheme	Varieties	Leaf surface oil of sunflower varieties according to options, (thousand cm^2/ha)							Leaf surface oil of sunflower varieties according to options, (thousand m^2/ha)			
			number of leaves, pcs	2012	number of leaves, pcs	2013	number of leaves, pcs	2014	Average	2012	2013	2014	Average
1	70x20-1	Jahangir (st)	23,6	4,3	24,5	4,5	23,0	4,1	4,3	30,4	31,8	30,0	30,7
2	70x25-1		23,9	4,5	24,7	4,6	23,5	4,2	4,4	25,7	26,3	24,0	25,3
3	70x30-1		24,7	4,6	25,2	4,7	25,0	4,3	4,5	21,9	22,3	20,5	21,6
4	70x35-1		24,9	4,7	25,4	4,8	25,2	4,5	4,6	19,1	19,5	18,3	19,0
5	70x20-1	Rodnik	23,6	4,5	24,7	4,6	24,2	4,3	4,5	32,0	32,7	30,6	31,8

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6	70x25-1		24,8	4,7	25,4	4,8	25,0	4,5	4,7	26,8	27,4	25,7	26,6
7	70x30-1		25,3	4,8	26,6	4,9	25,7	4,7	4,8	22,9	23,3	22,4	22,9
8	70x35-1		25,4	4,9	26,7	5,1	25,9	4,6	4,9	20,0	20,8	18,7	19,8
9	70x20-1	Dilbar	27,1	5,2	28,2	5,3	28,0	4,9	5,1	37,1	37,8	34,9	36,6
10	70x25-1		27,4	5,3	28,4	5,4	28,1	5,1	5,3	30,3	30,9	29,1	30,1
11	70x30-1		28,6	5,4	29,5	5,6	29,0	5,3	5,4	25,7	26,7	25,2	25,9
12	70x35-1		28,7	5,6	29,7	5,7	29,2	5,5	5,6	22,8	23,3	22,4	22,8
13	70x20-1	Navroz	24,6	4,8	25,7	5,0	25,1	4,7	4,8	34,2	35,7	33,5	34,5
14	70x25-1		26,5	5,1	27,4	5,2	27,0	5,0	5,1	29,1	29,7	28,5	29,1
15	70x30-1		27,3	5,2	28,5	5,4	28,2	5,1	5,2	24,7	25,7	24,2	24,9
16	70x35-1		27,4	5,4	28,6	5,5	28,4	5,3	5,4	22,0	22,4	21,6	22,0

This regularity was repeated in other varieties studied in the experiment and was observed in the planting scheme with the highest leaf level of 70x35–1. It was found that in the variant with planting scheme 70x20-1, in all varieties (4.3, 4.5, 5.1 and 4.8 thousand cm 2 /plant), one plant has less leaf surface. According to the varieties, a high rate was observed in the "Dilbar" variety. In this case, the lowest indicator was observed in the variant with planting scheme 70x20-1, 5.1 thousand cm2/bush; 5.3 thousand cm 2 /bush in the option with planting scheme 70x25-1; 5.4 thousand cm2/bush in the option with planting scheme 70x30-1; In the planting scheme of 70x35-1, it was found to be 5.6 thousand cm 2 /bush, which had the lowest indicator, and compared to the first option, it increased by 0.2-0.5 thousand cm2/bush.

In "Jahongir" variety, with the 70x20-1 planting scheme, the surface of leaves per hectare was 30.7 thousand m2/ha, while the surface of leaves decreased as the feeding area increased.

Compared to the first option with the highest index, the number of feeding areas increased by 5 cm in the following sequence was determined to be reduced to 2.6-6.3-11.7 thousand m2/ha, and the lowest index was observed in the planting scheme with 70x35-1.

This observed regularity was repeated in the studied varieties and planting schemes in the experiment, and it was found that in the "Rodnik" variety, compared to the variant with the planting scheme of 70x20-1, it decreased to 3.1-6.8-12.0 thousand m2/ha in the following sequence.

The planting scheme of "Dilbar" variety was 36.6 thousand m2/ha in the variant of 70x20-1, and 30.1 thousand m2/ha in the variant of planting scheme 70x25-1; 25.9 thousand m2/ha in the option with planting scheme 70x30-1; planting scheme was 22.8 thousand m2/ha in the option of 70x35-1.

The planting scheme of the "Navroz" variety was 34.5 thousand m2/ha in the 70x20-1 variant, and 29.1 thousand m2/ha in the 70x25-1 variant; 24.9 thousand m2/ha in the option with planting scheme 70x30-1; planting scheme was 22.0 thousand m2/ha in the option of 70x35-1.

According to the average three-year research results of sunflower varieties on leaf surface indicators per

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hectare, the highest indicator was observed in the "Jahongir", "Rodnik", "Dilbar" and "Navroz" varieties in the variant with the planting scheme 70x20-1 (30.7-31, 8-36.6 and 34.5 thousand m2/ha). It can be seen that leaf area per plant was higher in 70x35-1 planting scheme, whereas it was observed that leaf area per plant was higher in 70x20-1 planting scheme in terms of number of seedlings per hectare. When comparing the differences between the varieties according to the parameters of the leaf surface per hectare, the "Dilbar" and "Navroz" varieties had similar indicators, and a significant difference was observed in the "Jahongir" variety. According to the obtained results, it was found that "Dilbar" variety had a higher leaf surface area of 2.1-5.9 thousand m2/ha compared to "Navroz", "Jahongir", "Rodnik" varieties.

CONCLUSIONS

In all varieties used in the experiment, the number of leaves increased as the feeding area increased, and the highest value was observed in the planting scheme of 70x35–1. Due to the fact that the leaves of the sunflower variety "Dilbar" were large and produced a lot, it produced more leaves than all three varieties in terms of the number of leaves (27.8 - 29.2 pieces/bush) in all planting schemes.

As the feeding area of sunflower varieties increased, the leaf surface of one plant increased. Among the sunflower varieties, the highest rate was observed in the "Dilbar" variety (5.6 thousand cm2 /plant). "Jahongir" was 0.2-1.0 thousand cm2/bush higher than "Rodnik" and "Navroz" varieties. According to the data obtained on the leaf surface per hectare during the sunflower flowering period, due to the decrease in the number of plant stems per hectare, the highest leaf surface index in all varieties was observed in the variant with the planting scheme 70x20-1 (30.7-31.8-36.6-34.5 thousand m2/ha).

Among the sunflower varieties, the highest rate was observed in the "Dilbar" variety (36.6 thousand m2/ha). It was found that "Jahongir" was higher than "Rodnik" and "Navroz" varieties by 5.9-2.1 thousand m2/ha.

REFERENCES

1. Anarboev I.U. Prospects of growing oil crops in our republic - new technologies aimed at growing oil and fiber crops in Uzbekistan and increasing their productivity, Republic science. A collection of conference articles, T. 2009. P.6-7.
2. Anorboev I., Orolov Kh. Oil crops //Sunflower. Agriculture of Uzbekistan. J. 2009. No. 2. P.10-11
3. Azizov.T., Anarbaev I., Tukhtaeva S. // J. Agriculture of Uzbekistan. 2013. No. 6. P.5-6.
4. Methods of conducting field experiments T-2007. P. 133-138.
5. Tkalich I.D., Demidov A.A. Methods of sowing sunflower // Visn. agrarian Science.1999. No. 5. P.22-25, 85-87.
6. Tkalich I.D. Flower of the sun (basics of biology and agricultural technology of sunflower) // Dnepropetrovsk, 2011. P.172
7. Nichiporovich A.A. Photosynthesis and issues of plant productivity. - M.: Nauka, 1963. P.457.