



REQUIRED EFFECTIVE TEMPERATURE SUM FOR SUNFLOWER VARIETIES

Yuldasheva Zulfiya Kamalovna

Professor of Tashkent State Agrarian University.

Ergasheva Nargiza Khoshimjonovna

Assistant Teacher of Tashkent State Agrarian University

Abstract

The article experimentally revealed that the Dilbar variety of oil sunflower receives more effective temperature during the growing season than the Buzuluk and Zarrin varieties. In the variants with a sowing norm of 50, 60 and 70 thousand seeds/ha, it was observed that the temperature was higher when sowing on April 15 than when sowing on April 1 and May 1, while in the variant with a sowing norm of 80 thousand seeds/ha, on the contrary, a lower temperature was required. The Zarrin variety was distinguished from the experimental varieties by its early ripening and shorter days for transition from phase to phase. However, the pattern of higher effective temperature requirements was preserved in the variants with a higher sowing norm compared to the variants with a lower sowing norm.

Keywords: Sunflower, oil, norm, date, variety, effective, temperature, phase, quantity.

INTRODUCTION

In modern world agriculture, sunflower ranks fifth in terms of the total yield of the main oilseed crops. The share of sunflower in the total world oilseed production is only 7%, while the share of soybeans is about 57%, cotton and rapeseed - 12%, peanuts - about 8%, and the remaining 16% is accounted for by rapeseed, mustard, flax, rye, etc. This ratio has been maintained for several decades, but the total volume of oilseed production has increased significantly



[8]. Due to the high heat requirements of sunflower seeds during germination, it is considered a medium-term crop. Its seeds begin to germinate when the soil temperature is +4-5°C, but at this temperature the germination process is very slow (more than 20 days). Rapid germination of seeds and rapid and uniform germination (by the 12-14th day) are observed when the sowing layer of the soil is steadily warmed up to +10-12°C and the sum of active temperatures accumulates around 117-120°C. Sunflower plants can withstand short-term frosts down to minus 4-5°C during the germination period [1, 2, 3, 4, 5, 6].

MATERIALS AND METHODS

The scientific research work was carried out in 2022 at the experimental scientific research and educational experimental farm of Tashkent State Agrarian University.

The soil of the experimental farm is a typical non-saline sierozem soil that has been irrigated since ancient times. This soil contains 1.14-0.87% humus, about 0.102-0.082% nitrogen, about 0.160-0.150% phosphorus and about 1.85-1.75% potassium. The mobile forms of nutrient elements of the experimental field are N-NO₃ 12.6-9.9 mg/kg, P₂O₅ 37.20-33.86 mg/kg and K₂O 220.0-284.0 mg/kg.

In the field experiment, the sunflower varieties Dilbar, Buzuluk and Zarrin were planted in 36 variants, three replications. Each plot had an area of 56 m², of which the calculated area was 28 m². Sunflower varieties were sown at planting dates of April 1, April 15 and May 1 at planting norms of 50, 60, 70, 80 thousand seeds/ha. Based on the goals and objectives of the experiments, phenological observations and calculations were carried out on the oil sunflower variety.

RESULTS AND DISCUSSION

The effective temperature sum was determined in the growth and development phases of sunflower varieties. Favorable weather conditions were observed for the germination of sunflower seeds and uniform germination, and for full germination, the Dilbar and Buzuluk varieties, when planted on April 1, received



Modern American Journal of Biological and Environmental Sciences

ISSN (E): 3067-7920

Volume 01, Issue 06, September, 2025

Website: usajournals.org

This work is Licensed under CC BY 4.0 a Creative Commons Attribution 4.0 International License.

the same effective temperature, i.e. 166.9°C, even in 4 fields. For the Zarrin variety, a temperature sum of 155.3°C was sufficient. For the Dilbar (st) and Buzuluk varieties, when planted on April 15, a temperature sum of 144.7°C was sufficient, while for the Zarrin variety, a temperature sum of 133.1°C was sufficient. For the Dilbar and Buzuluk varieties, when planted on May 1, a temperature of 158.9°C was required for the full germination phase, while for the Zarrin variety, a temperature of 147.4°C was required.

Since the varieties differed in the transition days from the starling phase to the phase, the effective temperature sums also varied. When the Dilbar (st) variety was planted on April 15, it was found that the low-norm variants required the same temperature from the starling phase to the ripening phase, 176.0, 169.2, 364.4, 421.1, and 444.8 °C. In the variants with increased seeding norms for this variety, the starling phase required a higher temperature of 187.5 °C, but in the subsequent phases, on the contrary, a decrease was observed, i.e., effective temperatures of 146.7, 309.7, 395.4, and 379.9 °C were observed, since the transition phases were accelennormd in the variants with increased seeding norms compared to the variants with low seeding norms. A similar pattern was also observed in the Buzuluk and Zarrin varieties. When the variety was planted on April 15, in the options with a low planting norm, it received useful temperatures of 187.5, 146.7, 366.3, 404.1, and 425.4°C in the transition phases, while in the options with an increased planting norm, it was demanded 176.0, 132.0, 335.9, 395.1, and 403.2°C.



Table 1 Required effective temperature range for sunflower varieties in 2022, °C

Options	The name of the varieties	Sowing dates, date	Sowing norms piece/ha	Phases					Whole ripening	Total effective temperature range, °C
				germination	starling	budding	flowering	Seed filling		
1.	Dilbar (st)	1.04	50	166,9	158,8	173,5	337,6	446,8	385,0	1668,6
2.			60	166,9	158,8	173,5	337,6	446,8	385,0	1668,6
3.			70	166,9	173,3	169,0	282,3	394,5	407,7	1593,7
4.			80	166,9	173,3	158,9	276,5	387,6	408,0	1571,2
5.		15.04	50	144,7	176,0	169,2	364,4	421,1	444,8	1720,2
6.			60	144,7	176,0	169,2	364,4	421,1	444,8	1720,2
7.			70	144,7	176,0	169,2	329,2	407,7	417,4	1644,2
8.			80	144,7	187,5	146,7	309,7	395,4	379,9	1563,9
9.		1.05	50	158,9	146,7	196,8	381,6	405,5	411,2	1700,7
10.			60	158,9	131,6	178,1	377,2	407,7	413,0	1666,5
11.			70	158,9	131,6	160,8	350,4	385,7	421,4	1608,8
12.			80	158,9	120,5	156,0	345,8	394,1	444,2	1619,5
13.	Buzuluk	1.04	50	166,9	161,7	169,0	299,6	400,3	405,5	1603,0
14.			60	166,9	161,7	169,0	299,6	400,3	405,5	1603,0
15.			70	166,9	147,2	161,9	273,5	360,3	406,2	1516,0
16.			80	166,9	147,2	161,9	273,5	360,3	406,2	1516,0
17.		15.04	50	133,1	187,6	143,1	364,4	404,1	421,9	1654,2
18.			60	133,1	187,6	143,1	364,4	404,1	421,9	1654,2
19.			70	133,1	176,8	136,9	323,2	399,3	394,5	1563,8
20.			80	133,1	176,8	136,9	323,2	399,3	394,5	1563,8
21.		1.05	50	158,9	146,7	163,0	403,0	384,6	432,1	1688,3
22.			60	158,9	146,7	163,0	403,0	384,6	432,1	1688,3
23.			70	158,9	146,7	163,0	377,2	385,2	416,0	1647,0
24.			80	158,9	146,7	160,8	371,7	386,3	418,7	1643,1
25.	Zarrin	1.04	50	155,3	144,7	176,0	273,5	380,8	385,7	1516,0
26.			60	155,3	144,7	176,0	273,5	380,8	385,7	1516,0
27.			70	155,3	144,7	165,0	253,4	356,8	400,1	1475,3
28.			80	155,3	144,7	165,0	238,6	345,6	407,6	1456,8
29.		15.04	50	133,1	166,2	141,3	313,9	393,7	415,9	1564,1
30.			60	133,1	176,6	136,9	323,2	377,9	392,0	1539,7
31.			70	133,1	166,2	141,3	299,2	367,6	385,0	1492,4
32.			80	133,1	166,2	141,3	299,2	367,6	385,0	1492,4
33.		1.05	50	147,4	143,1	160,8	350,4	417,6	418,7	1638,0
34.			60	147,4	143,1	160,8	350,4	395,7	421,4	1618,8
35.			70	147,4	132,0	156,0	327,0	394,3	427,2	1583,9
36.			80	147,4	132,0	156,0	327,0	376,1	428,8	1567,3



Modern American Journal of Biological and Environmental Sciences

ISSN (E): 3067-7920

Volume 01, Issue 06, September, 2025

Website: usajournals.org

This work is Licensed under CC BY 4.0 a Creative Commons Attribution 4.0 International License.

When the Zarrin variety was planted on April 15, in the options with a low planting norm, it received useful temperatures of 166.2, 141.3, 313.4, 393.7, and 415.9°C in the transition phases, while in the options with an increased planting norm, it was 177.7, 141.3, 299.2, 337.6, and 385.0°C. demanded.

The total useful temperature sum of the Dilbar (st) variety was found to decrease in the variants with increased sowing norms, i.e., 1668.6, 1668.6, 1593.7 and 1571.2°C, while it was found that when sowing was carried out on April 15, a higher temperature was required, i.e., 1720.2, 1720.2, 1644.2 and 1563.9°C. It can be seen that in the variants with sowing norms of 50, 60 and 70 thousand seeds/ha, the temperature was 51.6, 51.6 and 50.5 °C higher than in the variants with sowing norms of 80 thousand seeds/ha, on the contrary, the temperature was 7.3 °C lower. When planted on May 1, the effective temperature sum was average compared to April 1 and April 15, and was 1700.7, 1666.5, 1608.8 and 1619.5 °C, respectively.

The Buzuluk variety, when planted on April 1, received a temperature of 1603.0 °C in the variants with low planting norms and 1516.0 °C in the variants with high planting norms, while when planted on April 15, it received temperatures of 1654.2 °C, 1654.2, 1563.8 and 1563.8 °C. It was found that temperatures of 1688.3 and 1643.1 °C were sufficient for the rapid ripening of sunflower on May 1.

The Zarrin variety stood out from the experimental varieties in terms of its rapid ripening and the short days of transition from phase to phase. However, in comparison to options with low seeding norm, the rule of higher effective temperature sum was maintained in the options with increased seeding norm. When planted on April 1, temperatures of 1516.0, 1516.0, 1475.3 and 1456.8°C were observed. 1564.1, 1539.7 and 1492.4°C when planted on April 15 and 1564.1, 1539.7, and 1492.4°C were observed when planting on May 1, because the transition phases of sunflower when planted on May 1 correspond to high temperature days of summer. It was found that 1638.0, 1618.8, 1583.9 and 1567.3°C are effective temperatures.



CONCLUSION

The experiment revealed that the Dilbar variety of sunflower receives more effective temperature during the growing season than the Buzuluk and Zarrin varieties. In the variants with a sowing norm of 50, 60 and 70 thousand seeds/ha, it was observed that the temperature was higher when sowing on April 15 than when sowing on April 1 and May 1, while in the variant with a sowing norm of 80 thousand seeds/ha, on the contrary, a lower temperature was required. The Zarrin variety was distinguished from the experimental varieties by its early ripening and shorter transition days from phase to phase. However, the pattern of a higher effective temperature requirement in variants with a higher sowing norm than in variants with a lower sowing norm was preserved.

REFERENCES

1. Васильев, Д.С. Агротехника подсолнечника - М.:Колос, 1983.–197 с. (In Russian language)
2. Морозов, В.К. Агробиологические основы возделывания подсолнечника. - Саратов: Саратов. кн. изд-во, 1953. - 244 с. (In Russian language)
3. Морозов, В.К. Подсолнечник в засушливой зоне. - Саратов: Прив. кн. изд-во, 1967. - 185 с. 136 113. Морозов, В.К. Подсолнечник в засушливой зоне. - Саратов: Прив. кн. изд-во, 1978. - 148 с. (In Russian language)
4. Растениеводство / П.П. Вавилов, В.В. Гриценко, В.С. Кузнецов; под ред. П.П. Вавилова - 2-е изд. - М.: Колос, 1981. - 432 с. (In Russian language)
5. Растениеводство / Г.С. Посыпанов, В.Е. Долгодворов, Г.В. Коренев и др.; Под ред. Г.С. Посыпанова – М.: Колос, 2006 – 620 с. (In Russian language)
6. Растениеводство / В.А. Федотов, С.В. Кадыров, Д.И. Щедрина, О.В. Столяров. - СПб.: Лань. 2015. - 336 с. (In Russian language)
7. Рекомендации по методике проведения наблюдений и исследований в полевом опыте / Под ред. Б.А. Смирнова. – Саратов: НИИСХ ЮгоВостока, 1973. - 223 с. (In Russian language)
8. Лукомец В.М., Кривошлыков К.М. Производство подсолнечника в Российской Федерации: состояние и перспективы // Земледелие. 2009. № 8. С. 3-6. (In Russian language)