Yield of Early Maturing Sunflower Varieties, Different-Aged Crops as a Secondary Crop in the Zarafshan and Surkhandarya Oases of Uzbekistan

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ABSTRACT

In Uzbekistan, oilseed sunflowers are grown mainly as a secondary crop on fertile land free from cereals.

Every summer, 1.1-1.3 million hectares of irrigated land in the country are cleared of cereals. Due to the hot climate in the southern oasis (Surkhandarya region), grain is harvested in the first 10 days of June, and in the Zarafshan oasis (Samarkand region) in the third 10 days of June, winter wheat is harvested.. Due to the different weather conditions in Surkhandarya and Samarkand regions, the sowing period of sunflower as a secondary crop differs significantly. Yields will also vary. Yields of early maturing sunflower SAI 20-80 and Dilbar varieties planted between June 20, June 30, July 10 and July 20 were analyzed as a repeat crop to determine the optimal planting time of sunflowers in both oasis soil climatic conditions.

KEYWORDS: *Surkhan oasis, Zarafshan oasis, sunflower, entomophilic plant, land vacated by cereals, repeat crop, sowing period, variety, growing season, oil.*

Introduction:. The resolution adopted by the President of the Republic of Uzbekistan in 2018 states that "according to the instructions on increasing the volume of vegetable oil and improving product quality, the area under sunflower has been increased to 29,000 hectares, and soybean to 31,000 hectares. The area of cotton used for the consumption of basic technical crops and oil in the country has been sharply reduced.[p.1; 8; 2-3.]

Around 75-80% of the vegetable oil imported into Uzbekistan today is sunflower oil. [3; 4;.]

The Zarafshan and Surkhan oases differ sharply in their geographical location and climatic conditions. The irrigated lands of Samarkand province are located 600-700 m above sea level and use the Zarafshan River for irrigation. The Surkhandarya oasis irrigated agriculture zone is located 400-600 m above sea level and uses the Surkhandarya River for irrigation. The biologically active potential of Samarkand region located in the Zarafshan oasis of Uzbekistan (useful temperature above 100 C 4248 + - 73 ^{0}C, duration of cold hot days 218-226 days, rainfall 390 + -70 mm, photosynthetic active radiation over 5 billion kcal/ha) allows cultivating sunflower varieties not only as a primary but also as a secondary crop.

[2; 8;.] The climate of the Surkhandarya oasis in the south of the country is warmer, with individual summer temperatures reaching 50 ^{0}C. In this region, apart from January and February, many crops can be observed during the growing season over a 10-month period [8; 9;.]

Among oilseeds, sunflowers rank second after shade in terms of crop area and first in terms of oil consumption. The area of oilseed sunflowers is 23-24 million hectares, with medium yields. It sorts 14-15 c/ ha. Absolute dry seed oil content is 54-56%. [3; 10;] This product is naturally pure, contains natural active ingredients that are easily absorbed by the human body. Contains vitamins A, B, D, E,

and the super trace element Selin. [4: 5;7]

Relevance; Cultivation of sunflower in Uzbekistan is included in the State Plan and is annually grown on 28-29 thousand hectares of irrigated land. However, sunflower is mainly grown as a secondary crop instead of cereals, which are revived in the summer harvest. [1;3; 4;.] In Surkhandarya region, grain crops (barley harvest) in the third 10 days of May, wheat harvesting begins in the first 10 days of June [8; 9;]

Due to the relatively cool weather conditions in the Zarafshan oasis (in the case of Samarkand province), the grain harvest takes place in the second and third 10 days of June.

However, due to the lack of timely organizational work, the harvest of wheat in the Surkhan oasis will continue in the third 10 days of June, and in the Zarafshan oasis until the first 10 days of July. [3; 4; 8;] Due to untimely cleaning of straw and roots left in place of the harvested crop, the preparation of the soil for planting is delayed. Due to the above reasons, as well as due to water shortages and failure of technical means, the sowing period of secondary crops will last until July and the beginning of August in the Zarafshan oasis. Yields and quality are low due to sowing of sunflower at different times in July, regardless of the growing season of the variety as a secondary crop. In this regard, it is important to determine the optimal planting time of sunflower, which is grown as a secondary crop in the irrigated conditions of Zarafshan and Surkhandarya oases.

The purpose of the study: If sunflower varieties are planted in the second and sometimes third 10 days of July, regardless of the growing season, the sunflower will pass the flowering phase in the second and third 10 days of September. At these times, the duration of sunny days is reduced by 4-5 hours compared to June, the air temperature cools down. Cloudy days occur, with rain and frequent winds. Such abiotic factors have a negative effect on sunflower yields. In addition, sunflower is an entomophilic plant, 95% of which is pollinated by bees. [5; 7;.] Due to the shortness of sunny days in late autumn, low air temperature, the activity of bees is absolutely weakened, and the flowers of sunflowers are not pollinated by 30-40%. As a result, 30-41% of the seeds in the basket are empty. [2; 9;]

Taking into account the above, scientific research was conducted in 2014-2016 to determine the planting period, which provides high and quality yields from early ripening varieties of sunflower, grown as a secondary crop in the Surkhandarya and Zarafshan oases.

Materials and methods: Field experiments were conducted as a repeat crop at the farm named after Nurmat Khodjakulov in Shurchi district of Surkhandarya region and the experimental farm of the Samarkand Veterinary Medicine Institute in Akdarya district of Samarkand region. The area of field experiments conducted in both conditions is meadow gray soil, the mechanical composition is medium sandy, the depth of groundwater is 3-4 m. In Samarkand region, the content of humus in the driving layer of field experimental soil - 1.08%, total nitrogen - 0.19%, phosphorus - 0.25%, gross potassium - 2.41%. In Surkhandarya region, humus -0.99%, gross nitrogen -0.17%, phosphorus-0.22%, gross potassium content -2.20% in the driving layer of field experimental soil.

In the field experiment, sunflowers were planted in four periods: June 20, June 30, July 10, and July 20. Two leagues of reproductive seeds of the varieties SAI-20-80 and Dilbar were used as the object of study. The area of the plots in all the varieties studied is 84 square metres and the experiment consists of 4 repetitions. Botany Research Institute of the Republic of Uzbekistan. (2009) Uzbekistan Research Institute of Vegetable, Melon and Potato Production (2011), Uzbekistan Research Institute of Cotton (2007) and generally accepted methods were used.

Research results: It was found that the data on the growth, development and yield of early maturing varieties of sunflower planted in the conditions of the Zarafshan and Surkhan oasis and at different

times differ significantly from each other.

The flowering phase of the early-ripening sunflower varieties planted in the Zarafshan oasis on 20 June coincided with the third of August to the first decade of September. In the first decade of September in Samarkand oblast the temperature is 18-23 ^{0}C, which is favourable for the development of sunflower growth. Sunflowers take 30-40 days from flowering to emergence. [5; 6;7;.] In Samarkand region, sunflower seeds go through the period of filling and ripening in September and October. A slowdown in photosynthetic intensity is observed in the third 10 days of September and relatively short days of sunny light in October. Eventually, the ripening period of the seed is delayed and it is observed that some of the seeds in the basket become useless. [8; 9;.] This is especially the case in the Samarkand region, where sunflowers were planted as a secondary crop on 20 July. This is because sunflowers planted between July 10 and 20 will go through the flowering phase on the second and third 10 days of September. During this time, compared to June, the duration of sunny days was reduced by 4-5 hours, and the temperature cooled down. For these reasons, in Samarkand region, the yield of early maturing sunflower varieties Dilbar and SAI 20-80, planted as an auxiliary crop on 10-20 July, is low - 16.3 and 17.4 c/ha, with an oil yield of 37.6-39.5% formed in seeds. The amount of oil per hectare was only 613-687 kg, with the highest yield in Samarkand region - 27.1-28.3 c/ha yielding 1.7-2.2 times the norm (sown on 30 June -25.4-26.1 c/ha).

Due to the fact that the climatic conditions of Surkhandarya oasis are warmer than in Zarafshan oasis, the vegetation period of varieties in Surkhandarya region was found to be 2 days shorter. In the first ten days of September, the temperature in this region was 22-26 ^{0}C. Such climatic conditions are very favorable for the development of sunflower growth. In Surkhandarya region, sunflowers grew well in October due to the fact that the temperature in September and October was hot, sunny and cloudy, and cloudy days were almost non-existent. Thus, in the field trial the sunflower yield on 30 June was 30.1-31.5 c/ha, while in Samarkand oblast the sunflower yield on 30 June was 4.7 vs. 25.4-26.1 c/ha. -5.4 c/ha. It should be noted that in Surkhandarya province, early-ripening sunflower varieties were planted before June 10, but 27.7-29.1 c/ha and even when sown on July 20, the yield was 24.6-25.3 c/ha.

Conclusion: In the grasslands of the Surkhandarya Oasis (Surkhandarya province), 30.1-32.3 c/ha of early maturing sunflower varieties Dilbar and SAI 20-80 were sown as a secondary crop by 30 June. In the Surkhan Oasis, 24.6-25.3 c/ha of early-ripening sunflower varieties planted on 20 July can be grown as a secondary crop.

In the Zarafshan oasis (Samarkand province), early-ripening sunflower varieties planted on 20 June yielded the highest yields at 27.1-28.3 c/ha. Under these conditions, 25.4-26.1 c/ha of early sunflower varieties when re-sown on 30 June yielded 46.4-47.7% oil in seed. The yield of sunflowers planted between 10 and 20 June and the amount of oil in the seeds was very low. Under the conditions of the Zarafshan oasis, it is inadvisable to plant oil sunflowers as a secondary crop in July.

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