



STUDY OF THE EFFECT OF NUTRITION AREA ON THE FIELD GERMINATION OF SUNFLOWER VARIETIES UNDER THE CONDITIONS OF KARAKALPAKSTAN

Seitbayev Rauaj Sarsenbayevich

Head of the Laboratory of Agrotechnology of Agricultural Crops and Soil Fertility
of the Karakalpak Research Institute of Agriculture, Doctor of Agricultural
Sciences

Turdishev Bekmurat Khodzhamuratovich

Director of the Karakalpak Research Institute of Agriculture, Candidate of
Agricultural Sciences, Senior Researcher

Saparova Ziywar Musaevna

Laboratory Assistant

Ismailov Bahadir Kalbaevich

Laboratory Assistant

Karakalpakstan Research Institute of Crop Farming

<https://doi.org/10.5281/zenodo.17256759>

Abstract

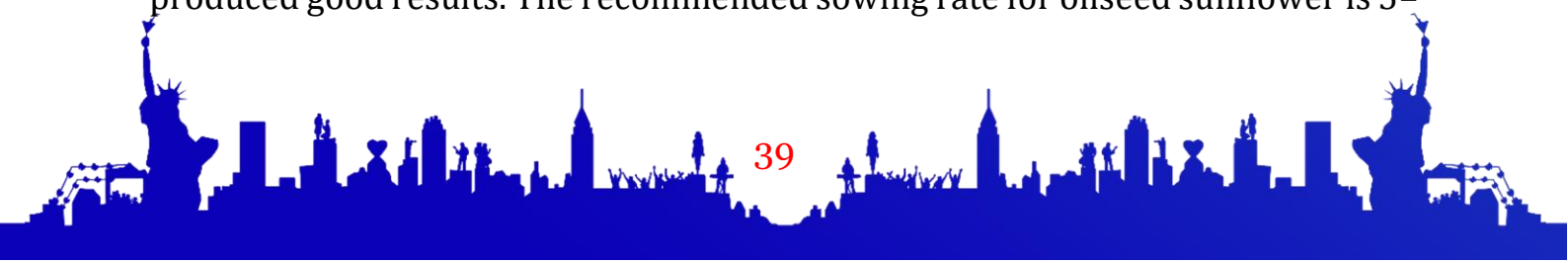
This article presents an analysis of the field germination of sunflower varieties under different planting schemes. The results showed that among the tested varieties, “KK-52” demonstrated a slight advantage in the germination period compared to other varieties.

Keywords: sunflower, varieties, planting scheme, germination, standard variety, observation, plant density, nutrition area, seedling number, indicator.

At present, the growing global demand for vegetable oil has led to a steady increase in the production of oilseed crops. Due to its high nutritional value and dietary properties, vegetable oil is replacing animal fats in human consumption. In the leading sunflower-producing countries, special attention is paid to increasing seed yield and quality by developing and applying advanced methods of soil management, variety selection, planting schemes, and cultivation technologies.

In Uzbekistan, large-scale measures are being implemented to further develop agriculture and fully meet the population’s demand for food, vegetable oil, and other agricultural products.

According to D.T. Abdukarimov [1] and others, sunflowers were sown with row spacing of 60–70 cm. Early-maturing, short-stemmed varieties (0.8–1.2 m in height) planted after grain harvesting at a density of 70,000 plants per hectare produced good results. The recommended sowing rate for oilseed sunflower is 5–





10 kg/ha, while for silage varieties it is 35–40 kg/ha. The optimal sowing depth is 6–7 cm, increasing to 8–10 cm in light soils.

According to I.D. Tkalic and A.A. Demidov [2], experiments conducted at two trial sites in the Dnipropetrovsk region involved the sunflower varieties “Rodnik”, “Kharkovsky 49 (short-stemmed)”, and “Kharkovsky 58”, which were sown between May 27 and June 6 with row spacings of 15, 30, 45, and 70 cm. Variants with 15–30 cm row spacing produced yields that were 1.8–3.3 centners per hectare higher compared to other variants.

According to the experiments of N.M. Tishkov, V.A. Tilba, and M.V. Shkarupa [3], conducted during 2015–2017, large-seeded sunflower varieties “SPK”, “Lakomka”, “Oreshok”, “Djinn”, “Belochka”, and “Krupnyak” were cultivated on the black soils of the Krasnodar Territory. The “Belochka” variety produced yields of **3.62–3.65 t/ha** when planted at a density of 40–50 thousand seedlings per hectare.

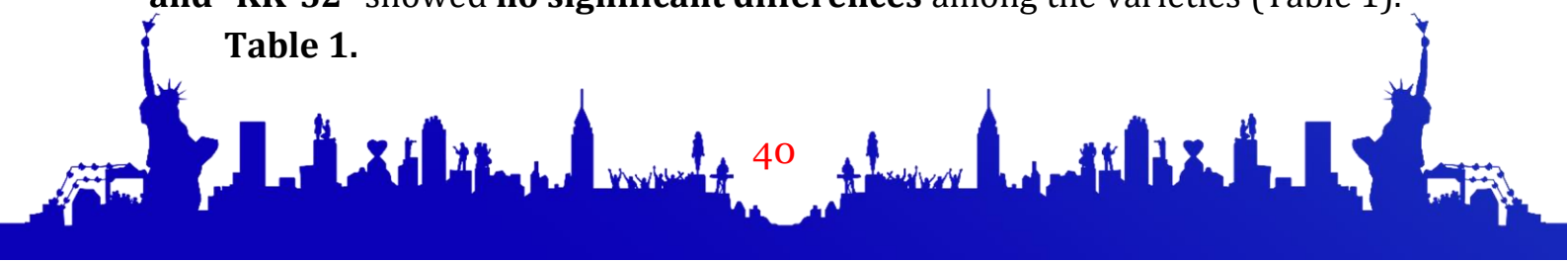
The key condition for achieving high yields is the **uniform germination** of the planted seeds. The germination rate of seeds plays a crucial role in yield formation. The main physiological processes occurring from seed germination to seedling emergence are related to seed imbibition (water absorption), sprouting, and the formation of seedlings.

One of the external factors influencing these processes is **temperature**. Sunflower seeds, after absorbing 80–90 % of their own weight in moisture, can germinate equally well at both 5–6 °C and 10–12 °C. In some cases, under very favorable conditions, moisture levels of 60–70 % are sufficient for germination. Water absorption by the seeds occurs rapidly, within a few hours, consuming a significant amount of growth energy. A sunflower seed can absorb water with a force up to **60,000 times greater than its own weight**. Within one hour of water uptake, the seeds expend about **80 % of their growth energy**, reaching maximum hydration within **15–24 hours**, after which no significant changes are observed.

There is a strong positive correlation between the **thousand-seed weight** and the intensity of water absorption: the larger the seeds, the more forcefully they imbibe water. This correlation remains consistent at both 5 °C and 30 °C.

In our study, the field germination of sunflower seeds was examined under different planting schemes. According to the results, the dependence of seed germination on the nutrition area for the sunflower varieties “KK-1,” “KK-60,” and “KK-52” showed **no significant differences** among the varieties (Table 1).

Table 1.





**Effect of Nutrition Area on the Germination Rate of Sunflower Varieties,
thousand seeds/ha**

№	Planting schemes	Varieties	Observation periods and number of plants, thousand/ha					Seed germination rate, %
			15.04	17.04	19.04	21.04	23.04	
1	60x20-1	KK-1 (st)	20,5	40,6	62,2	65,4	70,667	98,9
2	60x25-1		17,6	35,8	51,9	54,2	57,143	100
3	60x30-1		15,2	26,7	42,9	46,1	47,619	100
4	60x20-1	KK-60	18,9	30,2	54,5	58,8	71,120	99,5
5	60x25-1		16,4	26,6	44,9	47,1	57,011	99,7
6	60x30-1		16,7	28,6	41,	45,2	47,619	100,0
7	60x20-1	KK-52	22,7	37,8	48,4	55,3	71,286	99,8
8	60x25-1		19,9	40,2	45,4	48,6	57,143	100,0
9	60x30-1		19,7	30,3	35,3	39,3	47,619	100,0

In the sunflower varieties “**KK-60**” and “**KK-52,**” the seed germination rate was found to be higher from the earliest days of observation compared to the control variety “**KK-1.**” The number of seedlings in all experimental variants was similar, with plant counts in all planting schemes not falling below **99.4%**, and the seeds used for sowing had a germination capacity of **over 95%**.

On **April 20**—eight days after sowing—the germination rate of the control variety *KK-1* reached **98.9%** under the 60×20–1 planting scheme. In the same experiment, the varieties *KK-60* and *KK-52* reached full seedling emergence on **April 23**. Among the tested varieties, *KK-52* showed a slight advantage over the others in terms of the seedling emergence period (Table 1).

Based on the research results, it can be concluded that the sunflower varieties *KK-60* and *KK-52* demonstrated **higher seed germination rates from the earliest observation days** compared to the control variety *KK-1*. Among these, *KK-52* exhibited a **slight superiority** in the timing of seedling emergence.

References:

1. Abdukarimov D.T., Khalilov N.Kh., Lukov M.Q., Yuldasheva Z.K. va boshqalar. Kungaboqar yetishtirish texnologiyasi bo'yicha fermerlar uchun tavsiyanoma (Recommendation for Farmers on Sunflower Cultivation Technology), Toshkent – 2019, pp. 11–14.



2. Tkalich I.D., Demidov A.A. Способы посева подсолнечника// (Methods of Sunflower Sowing) // Висн. аграр. науки . (Bulletin of Agrarian Science), 1999, No. 5, pp. 22–25, 85–87.
3. Tishkov N.M., Tilba V.A., Shkarupa M.V. Масличный культуры (Oilseed Crops) // Научно-технический бюллетень Все российского научно-исследовательского института масличных культур Выпуск Краснодар (Scientific-Technical Bulletin of the All-Russian Research Institute of Oilseed Crops), Issue No. 2(174), Krasnodar – 2018, pp. 41–42.

