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THE EFFECT OF SOWING TIME AND RATES ON SOYBEAN YIELD

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Abstract:

The article presents yield indicators for two soybean varieties (Uzbek-6 and Nafis) at different sowing dates and sowing rates. Yields were compared by year (2022, 2023, 2024) and average values were calculated. Yield changes were recorded based on the results of a 3-year study conducted in the experimental field. According to the results, the most effective sowing date (01.05) was the late sowing date, with a yield of 39.93 c/ha from the Uzbek-6 variety at a rate of 375 thousand/ha. The average sowing date (15.04) was the highest yield at 375 thousand/ha, with a yield of 39.83 c/ha from the Uzbek-6 variety. The highest yield was 375 thousand/ha from the Uzbek-6 variety at an early sowing date, with a yield of 34.53 c/ha from the Uzbek-6 variety.

Keywords: *Yield, climate, bean, cultivar, field, experience, indicator, variant, fertility, efficiency, analysis, quality.*

INTRODUCTION

The increasing global demand for important food products, such as soybean (Glycine max), requires the expansion of agricultural crop areas and consistent supply of high-quality products. Currently, soybeans are cultivated on 122 million hectares worldwide, yielding over 362 million tons annually, including 37 million tons in Brazil, 31 million in the USA, 18 million in Argentina, 11 million in India, 9 million in China, and in Uzbekistan, 31,000 hectares are cultivated, producing 32.4 thousand tons of soybean grain.

However, with the growing demand for soy protein and oil, there is an increasing need for soybean varieties with higher protein and oil content.

Globally, the growth in soybean production is being driven by expansion of cultivated areas and increases in yield. Over the past decade, the average annual growth rate of sown soybean area has been 1.7%, and yields have risen by 1.0% annually, reaching an average of 2.8 tons per hectare.

At the same time, research is ongoing to determine how to position soybean varieties under different soil conditions, improve yield and grain quality (including protein and oil content), and develop agrotechnical practices that both maintain and enhance soil fertility.

According to studies by N. Umarova, R. Sayitkanova, and Kh. Idirsov, the combination of mineral fertilizers and foliar feeding with micronutrients can increase soybean grain yield by 6.2–14.2 centners per hectare [1].

G. Toshkhojaeva notes that in irrigated agriculture, crop yields depend largely on adequate water supply during the vegetation period, matching the biological needs of the plants. All physiological and biochemical processes in the plant require sufficient water. Soybean plants are particularly sensitive to water from flowering until pod ripening. A lack of moisture during this period causes flower and pod shedding, leading to decreased yields. Therefore, adequate irrigation is essential for achieving high yields [2].

T. Oserbaeva emphasizes the influence of sowing dates on yield. In the first variant, the "Nafis" soybean variety, sown on April 10 at 60 kg/ha, yielded 21.8 centners per hectare. In the second sowing period, the yield decreased to 19.8 c/ha, which is 2 c/ha less. In the last sowing period, the yield dropped to 18.6 c/ha, which is 3.2 c/ha lower than the first. Overall, sowing dates and seeding rates had a significant impact on biometric indicators, which confirmed the yield potential. It was observed that all biometric parameters decreased as the sowing date was delayed [3].

According to the research of S. Abdullah, V. Sharma, and P. Pathania, sowing soybean in the second week of June at a seeding rate of 100 kg/ha resulted in significantly higher grain yield and relative protein content [4].

According to the analysis by **F. Gabriel** and **A. Okorsky**, **sowing time also affected soybean yield**. This was primarily due to **climatic conditions**, particularly the **decisive influence of temperature**. A **linear regression analysis** revealed a correlation between the **duration of the vegetation period** and the **yield of soybeans sown on different dates** [5].

In our research conducted during **2022–2024** on the **light gray soils of the Kashkadarya region**, the **Uzbek-6** and **Nafis soybean** varieties were sown at **early (April 1), mid (April 15), and late (May 1)** dates,

using seeding rates of **325,000; 350,000; 375,000; and 400,000 seeds/ha**. Yield indicators were studied accordingly.

It was observed that **the grain yields obtained from the soybean varieties differed depending on the characteristics of the varieties and the mentioned parameters** (Table 1).

1-table

The Effect of Sowing Dates and Seeding Rates on the Yield of Soybean Varieties, c/ha (2022–2024)

N	Sowing date	Sowing rate	Variety name	Yield, c/ha			Average
				2022 y	2023 y	2024 y	
1	Early term (01.04)	325 thousand per hectare	Uzbek – 6	26,5	24,7	24,6	25,2
2			Nafis	24,7	21,9	20,7	22,4
3		350 thousand per hectare	Uzbek – 6	27,9	26,3	26,9	27,1
4			Nafis	30	27,7	27,2	28,3
5		375 thousand per hectare	Uzbek – 6	33,7	34,1	35,8	34,5
6			Nafis	33,7	33,8	36,3	34,6
7		400 thousand per hectare	Uzbek – 6	32,5	32,8	34,4	33,2
8			Nafis	32,3	31,6	33,7	32,5
9	Medium term (15.04)	325 thousand per hectare	Uzbek – 6	26,4	24,7	24,9	25,3
10			Nafis	25,4	23	22,6	23,7
11		350 thousand per hectare	Uzbek – 6	35,4	28,6	23,8	29,3
12			Nafis	37,7	29	22,7	29,8
13		375 thousand per hectare	Uzbek – 6	43	39,4	37,1	39,8
14			Nafis	37,3	34,5	33,4	35,1
15		400 thousand per hectare	Uzbek – 6	41,3	37,9	36,5	38,6
16			Nafis	35,1	32,3	30,5	32,6
17	Late period (01.05)	325 thousand per hectare	Uzbek – 6	27,8	24,9	23,9	25,5
18			Nafis	26	22,2	20,3	22,8
19		350 thousand per hectare	Uzbek – 6	29,7	28,1	28,3	28,7
20			Nafis	31,5	28,1	25,7	28,4
21		375 thousand per hectare	Uzbek – 6	39,5	39,2	41,1	39,9
22			Nafis	34,8	34,3	35	34,7
23		400 thousand per hectare	Uzbek – 6	35	33,7	34,5	34,4
24			Nafis	33	32,3	33,8	33

Analysis of Yield Variation by Soybean Varieties Studied in the Experiments

When analyzing the yield variation of the studied varieties in the experiments:

In the **early sowing period (April 1)**:

For the **Uzbek-6** variety:

At 325,000 seeds/ha: **25.2 c/ha**
At 350,000 seeds/ha: **27.1 c/ha**
At 375,000 seeds/ha: **34.5 c/ha**
At 400,000 seeds/ha: **33.2 c/ha**

For the **Nafis** variety:

At 325,000 seeds/ha: **22.4 c/ha**
At 350,000 seeds/ha: **28.3 c/ha**
At 375,000 seeds/ha: **34.6 c/ha**
At 400,000 seeds/ha: **32.5 c/ha**

The highest yield in this period was observed at a sowing rate of **375,000 seeds/ha**, with **34.5 c/ha** (Uzbek-6) and **34.6 c/ha** (Nafis).

In the **mid sowing period (April 15)**:

For the **Uzbek-6** variety:

At 325,000 seeds/ha: **25.3 c/ha**
At 350,000 seeds/ha: **29.3 c/ha**
At 375,000 seeds/ha: **39.8 c/ha**
At 400,000 seeds/ha: **38.6 c/ha**

For the **Nafis** variety:

At 325,000 seeds/ha: **23.7 c/ha**
At 350,000 seeds/ha: **29.8 c/ha**
At 375,000 seeds/ha: **35.1 c/ha**
At 400,000 seeds/ha: **32.6 c/ha**

The most favorable yield indicators were achieved at **375,000 seeds/ha**, with **39.8 c/ha** (Uzbek-6) and **35.1 c/ha** (Nafis).

In the **late sowing period (May 1)**:

For the **Uzbek-6** variety:

At 325,000 seeds/ha: **25.5 c/ha**
At 350,000 seeds/ha: **28.7 c/ha**
At 375,000 seeds/ha: **39.9 c/ha**
At 400,000 seeds/ha: **34.4 c/ha**

For the **Nafis** variety:

At 325,000 seeds/ha: **22.8 c/ha**
At 350,000 seeds/ha: **28.4 c/ha**
At 375,000 seeds/ha: **34.7 c/ha**
At 400,000 seeds/ha: **33.0 c/ha**

The **highest yields** were recorded at **375,000 seeds/ha**, reaching **39.9 c/ha** (Uzbek-6) and **34.7 c/ha** (Nafis).

Analysis Based on Sowing Dates and Seeding Rates

When analyzing the results based on sowing dates (early, mid, late), **the late sowing date (May 1)** provided the **highest yield**. At this time, the **Uzbek-6** variety produced **39.93 c/ha** at a seeding rate of **375,000 seeds/ha**. Additionally, the **mid sowing date (April 15)** also gave good results, with Uzbek-6 yielding **39.83 c/ha** at the same seeding rate.

In contrast, during the **early sowing period (April 1)**, the best yield was **34.53 c/ha** for Uzbek-6 at a seeding rate of 375,000 seeds/ha, which is comparatively lower than the mid and late sowing periods.

Analysis by Seeding Rate

The most effective seeding rate was **375,000 seeds/ha**, especially during the **late sowing period (May 1)**, which resulted in a yield of **39.93 c/ha** for Uzbek-6. The **400,000 seeds/ha** rate also gave high results, producing **38.56 c/ha**.

The **highest yield of the Nafis variety** was observed during the **mid sowing period (April 15)**, where it reached **30.29 c/ha**.

Analysis by Variety

The analysis by variety showed that **Uzbek-6 consistently produced higher yields across all sowing dates**. In particular, sowing at **375,000 seeds/ha** during the **late sowing date (May 1)** resulted in the **highest overall yield** of **39.93 c/ha**.

Meanwhile, the best performance of the **Nafis variety** was recorded during the **mid sowing period (April 15)** with **30.29 c/ha**, indicating that this sowing time is optimal for this variety.

CONCLUSIONS AND RECOMMENDATIONS

1. The **late sowing date (May 1)** and a **seeding rate of 375,000 seeds/ha** provide the **highest yield for the Uzbek-6 variety**.
2. The **mid sowing date (April 15)** is more suitable for the **Nafis variety**, showing its effectiveness.
3. **375,000 and 400,000 seeds/ha** are the most effective seeding rates, ensuring high productivity.

Therefore, selecting the correct sowing dates and seeding rates can **significantly improve soybean yield**. Adjusting these factors based on the chosen variety can also enhance efficiency and crop performance.

REFERENCES

1. N. Umarova, R. Saitkanova, K. Idirsov. The effect of micronutrients on the photosynthetic activity and yield of soybean // Agro Science Journal. 2013. No. 4. – P. 40.
2. G. Toshkhodjaeva. Problems and solutions of soybean cultivation in our country // Agro Science. Issue 2, 2023, pages 28-29.
3. T. Oserbaeva. The effect of sowing date and density on biometric indicators and yield of soybean varieties. // Agro Science, 2017. No. 5, p. 30.
4. S. Abdullah, V.K. Sharma, P. Pathania, and Sanjay K. Sharma. Himachal Journal of Agricultural Research 47(2): 251-255 (2021).
5. F. Gabriel, A. Okorsky. Agriculture 2023, 13, 2199.