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# Effect Of Stimulators On The Leaf Area Of Mungbean Varieties

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**Abstract**
This article provides information on the effect of stimulants on the leaf area of mung bean varieties. According to it, the best indicators were found when the Fitovak and Hosildor stimulants were applied to the Barqaror and Durdona varieties at 1.05 and 1.15 l/ha, respectively, with a higher leaf area.
**Keywords:** mung bean, variety, leaf area, biostimulant, Uzgumin, Fitovak, Yield.

## INTRODUCTION

Legumes are cultivated on 135 million hectares of land, of which 91.6 million hectares are cultivated as a secondary crop, with an average grain yield of 12.0 t/ha and a gross yield of 206.4 million tons. The world's yield of mung beans is 5.3 million tons, with India being the leading producer and consumer of mung beans. Extensive research is being conducted in the world on advanced resource-saving technologies for growing legumes, especially mung beans. Using the potential of mung beans, based on the scientific foundations of unique resource-saving cultivation technologies, environmentally friendly varieties suitable for soil and climatic conditions are being grown, rich in protein and vitamins. From this point of view, scientific research is being conducted to improve the agrotechnology of cultivation of high-yielding varieties of mung bean, namely, to correctly determine the planting dates and standards, optimize mineral fertilization, and correctly implement crop rotation, thereby restoring and increasing soil fertility, and providing livestock with nutritious feed.

This dissertation research will to a certain extent serve the implementation of the tasks set out in the decrees, resolutions, and other regulatory legal acts of the Republic of Uzbekistan “On approval of the Strategy for the Development of Agriculture of the Republic of Uzbekistan for 2020-2030” and “On measures for the effective use of land and water resources in agriculture” No. PD-5742 dated June 17, 2019 [1, 2].

According to the experimental results of Sh. Ernazarov, S. Negmatova, in the conditions of a typical gray soil region in the foothill plains of the Kashkadarya region, sowing mung beans in early July after winter wheat at the rate of 400 thousand seeds per hectare of land was economically effective [7; 27-28-p.].

M.I. Smirnova [8; 30-33-p.] noted that the protein content of legumes and grains varies depending on the type and variety, as well as the planting date and rate, therefore, it is necessary to create their high-protein varieties and develop agrotechnical care in accordance with soil and climatic conditions.

It was found that the planting scheme and the size of the bush affected the grain formation of mung beans, and the weight of 1000 ripened grains decreased as the size of the bush increased. It was found that the yield of mung bean variety Pobeda-104 was 60.3 grams when planted at 45x18 cm, and decreased to 52.7 grams when planted at 45x3; in these planting schemes, the yield of mung bean variety Radost decreased from 59.4 grams to 52.9 grams, in the Pobeda-104 variety from 61.6 to 55.6

grams, and in the Radost variety from 57.1 to 55.1 grams [4;13-p.].

According to the conclusions of the research conducted in the Namangan region by R. Tillayev, A. Mansurov, A. Mominov, an average grain yield of 14.7 t/ha was obtained from repeatedly planted mung bean. It was also found that an average of 4.4 tons of stalks and root residues remained per hectare in the areas planted with mung bean. They observed that the decomposition of these stubble and root residues enriched the soil with 53 kg of nitrogen, 19 kg of phosphorus and 13 kg of potassium per hectare [9; p. 50].

A. Mansurov's experiments conducted in the conditions of meadow-gray soils of the Andijan region showed that the improvement of soil water permeability depends not only on the cover crops planted after winter wheat, but also on the sowing rate. Because the root and stubble residues remaining from the repeated sowing of mung bean enrich the soil layers with organic matter and affect the physical properties of this soil, as well as the amount of nutrients in the soil [3; p. 119].

B. Kholikov, based on many ears of experience, emphasizes that repeated crop varieties can be planted from June 1-5 to July 10, depending on the soil and climatic conditions of our republic [10; p. 42]. In recent ears, I. Karabayev, A. Rozikov, S. S. Boriyev [6; p. 222-234], I. N. Khoshimov, M. M. Sarimsakov, T. Rajabov [5; p. 68-71].

## MATERIALS AND METHODS

The scientific research work was conducted at the experimental scientific research and educational experimental farm of Tashkent State Agrarian University in 2023-2025. The experimental farm is located in the upper reaches of the Chirchik River, at an altitude of 481 m above sea level, at 410 11II north latitude and 380 31II east longitude in the Kibray district of Tashkent region.

The experiment studies the effect of stimulants on the “Durdona” and “Barqaror” varieties of mung bean. The following options are being studied in the experiment: The experiments are being carried out in field and laboratory conditions. The research uses the methods of "Methods of conducting field experiments" (T. UzPITI 2007), "Methodology of field experiments" (B. Dospekkhov, 1985), "Methodology of State variety testing of agricultural crops" (1985, 1989), and "Methods of agrochemical and agrophysical research of Central Asian soils" (1988).

## RESULTS AND DISCUSSION

In the Barqaror variety of mung bean, the leaf area in the budding phase was 335.9 cm2/bush in the control (water) variant and 339.3 cm2/bush in the Uzgumin (standard) variant. In the variants where the Fitovak stimulator was applied at rates of 0.9; 1.05 and 1.2 l/ha, the leaf area was 347.1; 354.1 and 349.1 cm2/bush, which indicated that these indicators were 11.2; 18.2 and 13.2 cm2/bush than the control (water) variant and 7.8; 14.8 and 9.8 cm2/bush than the Uzgumin (standard) variant. In the variants where the yield stimulator was applied at rates of 0.9; 1.15 and 1.4 l/ha, the leaf area was 345.4; It was determined that the leaf area was 351.3 and 348.1 cm2/bush, which was 9.5; 15.4 and 12.2 cm2/bush than the control (water) variant and 6.1; 12.0 and 8.8 cm2/bush than the Uzgumin (standard) variant.

**Table 1. The effect of stimulants on the leaf area of mung bean varieties (2023-2025)**

| General norms of stimulants, l/ha | budding, $cm^2$/bush | flowering, $cm^2$/bush | podded, $cm^2$/bush | $m^2$/ha |
|---|---|---|---|---|
| **Barqaror** | | | | |
| Control (water) | 335,9 | 812,9 | 1040,5 | 28,1 |
| Uzgumin (standard) – 1,9 l/ha | 339,3 | 821,1 | 1051,0 | 29,0 |
| Fitovak – 0,9 l/ha | 347,1 | 840,0 | 1075,2 | 30,2 |
| Fitovak – 1,05 l/ha | 354,1 | 856,8 | 1096,8 | 31,4 |
| Fitovak – 1,2 l/ha | 349,1 | 844,8 | 1081,3 | 30,7 |

| | | | | |
|---|---|---|---|---|
| Hosildor – 0,9 l/ha | 345,4 | 836,0 | 1070,0 | 30,1 |
| Hosildor – 1,15 l/ha | 351,3 | 850,1 | 1088,1 | 31,2 |
| Hosildor – 1,4 l/ha | 348,1 | 842,4 | 1078,3 | 30,6 |
| **Durdona** | | | | |
| Control (water) | 323,0 | 775,2 | 984,5 | 26,2 |
| Uzgumin (standard) – 1,9 l/ha | 326,3 | 783,0 | 994,4 | 27,0 |
| Fitovak – 0,9 l/ha | 333,8 | 801,0 | 1017,3 | 27,5 |
| Fitovak – 1,05 l/ha | 340,5 | 817,1 | 1037,7 | 28,7 |
| Fitovak – 1,2 l/ha | 335,7 | 805,6 | 1023,1 | 27,9 |
| Hosildor – 0,9 l/ha | 332,2 | 797,2 | 1012,4 | 27,6 |
| Hosildor – 1,15 l/ha | 337,8 | 810,6 | 1029,5 | 28,7 |
| Hosildor – 1,4 l/ha | 334,7 | 803,3 | 1020,2 | 28,2 |

In the flowering phase, the leaf area was 812.9 cm2/bush in the control (water) variant and 821.1 cm2/bush in the Uzgumin (standard) variant. In the variants where the Fitovak stimulator was applied at rates of 0.9; 1.05 and 1.2 l/ha, the leaf area was 840.0; 856.8 and 844.8 cm2/bush, which indicated that these indicators were 27.1; 43.9 and 31.9 cm2/bush than the control (water) variant and 20.9; 35.7 and 23.7 cm2/bush than the Uzgumin (standard) variant. In the variants where the yield stimulator was applied at rates of 0.9; 1.15 and 1.4 l/ha, the leaf area was 836.0; 850.1 and 842.4 cm2/bush, which are 23.1; 37.2 and 29.5 cm2/bush in the control (water) variant and 14.9; 29.0 and 21.3 cm2/bush in the Uzgumin (standard) variant.

In the podded phase, the leaf surface was 1040.5 cm2/bush in the control (water) variant and 1051.0 cm2/bush in the Uzgumin (standard) variant. In the variants where the Fitovak stimulator was applied at rates of 0.9; 1.05 and 1.2 l/ha, the leaf surface was 1075.2; 1096.8 and 1081.3 cm2/bush, which are 34.7; It was determined that the leaf area was 56.3 and 40.8 cm2/bush and 24.2; 45.8 and 30.3 cm2/bush from the Uzgumin (standard) variant. In the variants where the yield stimulator was applied at rates of 0.9; 1.15 and 1.4 l/ha, the leaf area was 1070.0; 1088.1 and 1078.3 cm2/bush, and these indicators were 29.5; 47.6 and 37.8 cm2/bush from the control (water) variant and 19.0; 37.1 and 27.3 cm2/bush from the Uzgumin (standard) variant.

Based on 3-year data, the control (water) variant was 28.1 m2/ha and the Uzgumin (standard) variant was 29.0 m2/ha. In the variants where the Fitovak stimulator was applied at rates of 0.9; 1.05 and 1.2 l/ha, the leaf surface was 30.2; 31.4 and 30.7 m2/ha, which indicated that more leaf surface was formed than in the control (water) variant by 2.1; 3.3 and 2.6 m2/ha and the Uzgumin (standard) variant by 1.2; 2.4 and 1.7 m2/ha. In the variants where the yield stimulator was applied at rates of 0.9; 1.15 and 1.4 l/ha, the leaf surface was 30.1; It was determined that the leaf area was 31.2 and 30.6 m2/ha, which is 2.0; 3.1 and 2.5 m2/ha more than the control (water) variant and 1.1; 2.2 and 1.6 m2/ha more than the Uzgumin (standard) variant.

In the Durdona variety, the leaf area in the budding phase was 323.0 cm2/bush in the control (water) variant and 326.3 cm2/bush in the Uzgumin (standard) variant. In the variants where the Fitovak stimulator was applied at rates of 0.9; 1.05 and 1.2 l/ha, the leaf area was 333.8; 340.5 and 335.7 cm2/bush, which indicated that these indicators were 10.8; 17.5 and 12.7 cm2/bush than the control (water) variant and 7.5; 14.2 and 9.4 cm2/bush than the Uzgumin (standard) variant. In the variants where the yield stimulator was applied at rates of 0.9; 1.15 and 1.4 l/ha, the leaf area was 332.2; 337.8 and 334.7 cm2/bush, which are 9.2; 14.8 and 11.7 cm2/bush compared to the control (water) variant and 5.9; 11.5 and 8.4 cm2/bush compared to the Uzgumin (standard) variant.

In the flowering phase, the leaf surface was 775.2 cm2/bush in the control (water) variant and 783.0 cm2/bush compared to the Uzgumin (standard) variant. In the variants where the Fitovak stimulator was applied at rates of 0.9; 1.05 and 1.2 l/ha, the leaf surface was 801.0; 817.1 and 805.6 cm2/bush, which are 25.8; 11.5 and 8.4 cm2/bush compared to the control (water) variant. It was determined that the leaf area

was 41.9 and 30.4 cm2/bush and 18.0; 34.1 and 22.6 cm2/bush from the Uzgumin (standard) variant. In the variants where the yield stimulator was applied at rates of 0.9; 1.15 and 1.4 l/ha, the leaf area was 797.2; 810.6 and 803.3 cm2/bush, and these indicators were 22.0; 35.4 and 28.1 cm2/bush from the control (water) variant and 14.2; 27.6 and 20.3 cm2/bush from the Uzgumin (standard) variant.

In the podded phase, the leaf area was 984.5 cm2/bush in the control (water) variant and 994.4 cm2/bush in the Uzgumin (standard) variant. In the variants where the Fitovak stimulator was applied at rates of 0.9; 1.05 and 1.2 l/ha, the leaf area was 1017.3; 1037.7 and 1023.1 cm2/bush, which indicated that these indicators were 32.8; 53.2 and 38.6 cm2/bush than in the control (water) variant and 22.9; 28.7 and 18.0 cm2/bush than in the Uzgumin (standard) variant. In the variants where the yield stimulator was applied at rates of 0.9; 1.15 and 1.4 l/ha, the leaf area was 1012.4; 1029.5 and 1020.2 cm2/bush, these indicators were 27.9; 44.7 and 35.7 cm2/bush for the control (water) variant and 18.0; 35.1 and 25.8 cm2/bush for the Uzgumin (standard) variant.

Based on 3-year data, the control (water) variant was 26.2 m2/ha and the Uzgumin (standard) variant was 27.0 m2/ha. In the variants where the Fitovak stimulator was applied at rates of 0.9; 1.05 and 1.2 l/ha, the leaf surface was 27.5; 28.7 and 27.9 m2/ha, these indicators were 1.3; It was determined that the leaf area was formed by 2.5 and 1.7 m2/ha and the Uzgumin (standard) variant by 0.5; 1.7 and 0.9 m2/ha. In the variants where the yield stimulator was applied at rates of 0.9; 1.15 and 1.4 l/ha, the leaf area was 27.6; 28.7 and 28.2 m2/ha, while these indicators were determined that the control (water) variant by 1.4; 2.5 and 2.0 m2/ha and the Uzgumin (standard) variant by 0.6; 1.7 and 1.2 m2/ha.

## CONCLUSION

In conclusion, it was found that the best indicators were the highest leaf area when the Fitovak and Hosildor stimulants were applied to the Barqaror and Durdona varieties at 1.05 and 1.15 l/ha, respectively.

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