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ANALYSIS OF VALUABLE ECONOMIC TRAITS IN MUNGBEAN CULTIVARS AND SAMPLES

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Abstract: In the experiments, economically valuable traits of mungbean cultivars and samples were studied. The main goal of the research is the selection of samples with high indicators in mung bean varieties and samples. Varietal characteristics of the Durdona and Osiyo varieties, as well as the VI-062909 and VI-060020 A-G lines, were determined based on the methods and recommendations of B. A. Dospekhov "Methodology of Field Experiment" (Moscow 1985) and ISTA's International Rules for Seed Testing (ISTA, 2023). According to the results, the Durdona variety and the VI-062909 line showed positive indicators for yield, stable vegetation period, and productivity in per plant. The Asian variety showed moderate stability, while the VI-060020 A-G line showed a positive results about 1000-grain weight. Durdona and VI-062909 samples are a promising genetic source for further breeding and seed production experiments.
Key words: mungbean, cultivars, line, yield, productivity per plant, vegetation period, thousand grain weight, pod, fenological observations.

INTRODUCTION.

The mungbean plant (Vigna radiata L.) is considered one of the main leguminous crops in our republic, providing the population with food, and due to its short vegetation period, it has the opportunity to obtain two high and quality yields in one season. In our Republic, a number of scientific studies are being conducted on the selection of mung beancrops, and cultivars with high economically valuable traits are being created. However, the creation of varieties resistant to stress factors of the external environment with high yields has important economic significance in agriculture.

M. A. Sattorov., I. T. Mirzayeva., N. G'. Otamirzaev [5; 40-41-b.]. It is shown that when measuring the vegetation period, plant height, number of pods per plant, grain weight per plant, weight of 1000 grains, and yield indicators in the competitive experimental field using the Radost mungbean variety as a control variety, samples AG-92273 (India), AG-92265 (India), 414360 (Philippines), and 522773 (India) showed positive indicators compared to the control variety.

X.A. Idrisov's [3; 74-78-b.]. studies have shown that in many farms, due to incorrect sowing dates, 12% of the harvest is lost due to weed infestation, 12% due to insects, and 5% due to diseases. The testing of mungbean varieties by the World Vegetable Center and the correct selection of plant density in planted varieties, the introduction of stand-growing and short-ripening varieties suitable for new intensive conditions in large areas instead of local varieties, led to an increase in yield in a short time.

J. Tian et al. [6; 2065-p.]. provided information about the newly created variety of mungbean Jilv20, which was created as a result of hybridization of the varieties Bao 942-34 and Weilv 9002-341. The vegetation period of this variety in spring sowing was 79.5 days, and in summer sowing - 66.7 days, the average plant height was 56.4 cm, the yield in the northern regions was 17.9 c/ha, and in the southern regions - 20.1 c/ha. This indicator is 27.83%, 28.48%, and 6.96% higher, respectively, compared to the Zhonglv 5 variety, which is popular in China.

L Wang and co-authors [7; 707-p.]. high yield, resistance to high stress factors, and wide adaptability are considered important varietal characteristics, especially for photosensitive and temperature-sensitive crops. Mungbean is a typical short-day plant traditionally grown in Asian countries and consumed worldwide. However, until recent decades, relatively few studies have been conducted on its genetic improvement. Zhongli 5 is a mungbean variety created through crossbreeding in China at the beginning of the century. Since then, it has played an important role in improving mungbean cultivation in China due to its high yield, stress resistance, and wide adaptability. Cultivation and testing over the years have shown that Zhongli 5 is an early-ripening variety with a growth period of about 70 and 85 days during the summer and spring seasons, respectively. It is erect at a height of 60-70 cm, the stem is resistant to lodging.

According to the World Food Organization (FAO), mungbean production worldwide is increasing annually. In 2024, the global mungbean harvest amounted to 5.3 million tons, and the area was 7.3 million hectares.

MATERIALS AND METHODS.

The research was conducted in a small experimental field of the Karakalpak Institute of Agriculture and Agrotechnologies and in the laboratory of the Department of "Farming, Plant Breeding and Seed Production of Agricultural Crops" in 2025. In laboratory experiments, the weight of 1000 grains, productivity per plant and yield indicators were determined based on ISTA's International Rules for Seed Testing (ISTA, 2023) methods and recommendations. Field experiments, sowing process, phenological observations, crop care, , biometric measurements, and statistical analyses are carried out based on B. A. Dospekhov's "Methodology of Field Experiment" (Moscow 1985) and other sources, recommendations, and methods.

During the experiments, observations and measurements of economically valuable traits of mung bean varieties and samples were carried out according to the following indicators.

-Vegetation period (day)
-number of pods per plant (piece)
- total yield (ts/ha)
-productivity per plant (gr)
- thousand grain weight (gr)

In the studies conducted on mungbean cultivars and samples, statistical analysis of economically valuable traits was carried out using MS Excel and Mal-Viva programs.

RESULTS AND DISCUSSION

According to studies conducted on economically valuable traits of mungbean varieties and samples, significant phenotypic differences were noted between the samples. In the studies, such economically valuable traits as the vegetation period, the number of pods per plant, productivity per plant, total yield, and the weight of 1000 grains were analyzed for the Durdona and Osiyo varieties and the VI-062909 and VI-060020 A-G lines. These traits are the main indicators that shape productivity, and their genetic inheritance is interconnected with environmental factors. Significant differences were observed in the samples in terms of the duration of the growing season. Among the samples, the early maturity of the Durdona variety was 75.1±0.4 days. The sum of squared deviations of 0.81 and V%=1.08 in this variety indicates a high degree of genetic control. The vegetation period of the Asian variety was 80.8±0.62 days, V%=1.55. In lines VI-062909 and VI-060020 A-G, the vegetation period was 77.7±0.33 and 82.8±0.25 days, respectively, and the coefficient of variation was very low and V%= 0.74 and 0.7. In these lines, the square deviations were also equal to G=0.58 and 0.5, respectively. The prolongation of the growing season often leads to a greater accumulation of biomass. However, if this situation does not balance the number of pods and grain ripening, it can negatively affect the yield.

Significant differences were also revealed in the number of pods per plant, where the highest indicator was mainly found in the Durdona variety and averaged 43.8±2.76. In this variety, the sum of square deviations was G=8.74, and the coefficient of variability was V%=19.25, which indicates the presence of an average phenotypic difference in the trait. In the Osiyo variety, the number of pods was 32.9±2.24 pieces, G=7.1 and V%=21.6, which indicates the influence of this trait on environmental factors. In the VI-062909 line, the sum of square deviations was G=5.16 and the number of pods was 31.4±1.63, and the coefficient of variation was V%=16.45. This indicator indicates the presence of genetic stability in the studied samples. In the VI-060020 A-G line, the number of pods was 31.3±3.04 pieces. In this line, the sum of square deviations G=9.61 and V%=30.72 indicates a high sensitivity to the external environment.

Although a high number of pods in breeding research positively affects the overall yield, samples with a predominant G value are considered superior for obtaining a stable yield.

The data obtained on the productivity of one plant show that it is formed in relation to the number of pods and the weight of 1000 seeds. The productivity of the Durdona variety was the highest and amounted to 20.0±1.75 g. In this variety, G=5.53, and the coefficient of variation V%=27.69. In the Osiyo variety, the yield per plant was 10.8±1.7 g, G=5.37 and V%=49.7. In lines VI-062909 and VI-060020 A-G, the productivity was 14.1±1.11 and 13.7±1.02 g, respectively, and the sum of the square deviations was equal to G= 3.51 and 3.22, correspondingly. The degree of variability in these lines was V%=24.9 and 22.5, respectively. Despite the fact that high productivity is associated with the number of pods, it has a negative correlation with the weight of 1000 seeds.

The total yield indicator has a complex effect with the number of pods, productivity per plant, and the growing season. In the Durdona variety, the highest yield was 22.9 c/ha, while the lowest yield was 12.6 c/ha for the Asian variety. This is due to low productivity and the number of pods. In the VI-062909 and VI-060020 A-G lines, the yield indicators were close to each other and amounted to 16.2 and 15.9 c/ha, respectively. This result makes it possible to use them in the breeding process as lines with a stable yield.

In studies conducted on the weight of 1000 seeds, relatively small differences were observed between varieties and lines. This indicates the hereditary stability of this trait in the studied samples. The highest indicator in the Durdona variety was 65.3 g, and in the Osiyo and VI-060020 A-G lines - 62.1 and 62.4 g, respectively. The lowest indicator was noted in the VI-062909 line - 59.2 g.

In general, according to the complex analysis of G (sum of squared deviations) and the coefficient of variation V%, the vegetation period and the weight of 1000 seeds have a high degree of genetic stability, and phenotypic differences in productivity and the number of pods per plant are wide. (Table 1)

1-table

Valuable economic traits of mung bean varieties and samples

№	Cultivars and lines	Vegetation period (day)			Number of pods (per-plant)			Productivity (per plant)			Yield Ts/ha	1000-grain weight (gr)
		M±m	G	V %	M±m	G	V %	M±m	G	V %		

1	**Durdona**	75,1±0,4	0,81	1,08	43,8±2,76	8,74	19,25	20±1,75	5,53	27,69	22,9	65,3
2	**Osiyo**	80,8±0,62	1,25	1,55	32,9±2,24	7,1	21,6	10,8±1,7	5,37	49,7	12,6	62,1
3	**VI-062909**	77,7±0,33	0,58	0,74	31,4±1,63	5,16	16,45	14,1±1,11	3,51	24,9	16,2	59,2
4	**VI-060020 A-G**	82,8±0,25	0,5	0,7	31,3±3,04	9,61	30,72	13,7±1,02	3,22	22,5	15,9	62,4

CONCLUSION.

To conclude, the duration of the growing season, yield, and high indicators were noted in the studied varieties and samples of mung bean according to economically valuable traits in the Durdona variety and the VI-062909 line. Asian variety were obtained positive results in terms of the number of pods per plant, and in the VI-060020 A-G line - in terms of the weight of 1000 grains. Varieties and lines with high results in economically valuable traits are recommended for practical breeding and genetic research as a genetic resource.

References

1. Доспехов В. А. Методика полевого опыта.-Москва.: Kolos, 1985.-С. 317. https://arm.ssuv.uz/frontend/web/books/652527ba2ddf1.pdf
2. Food and Agriculture Organization of the United Nations (FAO). (2025). *FAOSTAT: Crops → Pulses → Mungbean. Data retrieved June 2025 from* https://www.fao.org/faostat/en/#data
3. İdrisov X.A. Turli muddat va me'yorlarda ekilgan mosh navlarining ko'chat qalinligini o'rganish.-Farg'ona: Qo'llanma. - 2022. -B. 74-78.
4. International Seed Testing Association (ISTA). International Rules for Seed Testing.- Bassersdorf, Switzerland, 2023.- 72-b.

https://www.seedtest.org/en/publications/international-rules-seed-testing.html

5. Sattorov M. A., Mirzayeva I. T., Otamirzaev N. G' . Mosh nav va namunalarini raqobatli nav sinovida o'rganish natijalari// O'zbekiston qishloq va suv xo'jaligi jurnali.- № 3.-2025.-B. 40-41.
6. Tian J., Fan B., Zhu Z., Liu C., Wang S., Wang L., Wang Y., Shi H., Zhang Z., Su Q., Shen Y., Cao Z. Breeding and Agronomic Evaluation of Jilv 20, a New Mungbean (*Vigna radiata* L.) Cultivar // Agronomy. - 2022. - Vol.12, No.9.- P. 2065. https://doi.org/10.3390/agronomy12092065

7. Wang L., Wang S., Luo G., Zhang J., Chen Y., Chen H., Cheng X. Evaluation of the production potential of mung bean cultivar “Zhongli 5” // Agronomy.- 2022. - Vol. 12, No. 3.- P. 707. https://doi.org/10.3390/agronomy12030707