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# DETERMINING OF GERMINATION ABILITY OF CULTIVARS AND LINES OF MUNGBEAN UNDER LABORATORY CONDITION

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***Abstract.*** *The study was carried out to determine the germination rate of mungbean (Vigna radiata L.) cultivars and lines under laboratory conditions. Two cultivars (Durdona and Osiyo) and two breeding lines (VI-060020 A-G, and VI-062909) were tested according to the International Seed Testing Association (ISTA, 2023) rules. In each replication, 15 seeds were used and the experiment was conducted in three replications. The results showed that the highest germination rate was recorded in the Durdona cultivar (91.90%) and VI-062909 line (92.57%), which were classified into the first category. Meanwhile, Osiyo (88.06%) and VI-060020 A-G (83.68%) demonstrated relatively lower germination and were classified into the second category. These results indicate that Durdona and VI-062909 can be considered as promising genetic resources for further breeding and seed production.*

***Keywords:*** *mungbean, germination, ISTA, cultivars, lines, seed, petri dishes, temperature, moisture.*

**Introduction**. Mung bean (Vigna radiata L.) is an important legume crop characterized by its high protein content and agronomic advantages. Seed quality and germination have a direct impact on crop productivity and field establishment efficiency. Therefore, evaluating seed germination under laboratory conditions is essential for assessing the biological potential of different varieties.

According to B. Kosbergenova [4; pp. 66–68], mung bean varieties cultivated in our Republic are mostly medium-maturing, late-maturing, or very late-maturing, with a vegetation period ranging from 85 to 120 days. Cultivated mung bean varieties are classified into five groups based on the length of their vegetation period: very early-maturing (60–75 days), early-maturing (75–90 days), medium-maturing (85–105 days), late-maturing (100–115 days), and very late-maturing (more than 115 days). According to H. N. Atabayeva and Kh. A. Idrisov [1; pp. 422–426], leaf development is directly dependent on the sowing time and seeding rate. When mung bean is sown in early July, the number of leaves increases; however, with an increase in seeding rate, the number of leaves

decreases. For any variety, when the seeding rate is set at 40 kg/ha, the leaf area reaches its highest value across all sowing dates. Nevertheless, as the sowing date is delayed, a decreasing trend in leaf area is observed.

According to I. Israilov [2; pp. 11–14], an increase in sowing density in mung bean varieties reduces the amount of dry matter accumulated per plant. This indicator is also directly dependent on the sowing date, with later sowings leading to a decrease in dry matter content. For example, in early sowing variants planted on June 25, the dry matter content depending on the seeding rate was 47.0–51.1 g in the variety “Radost”, 48–52 g in “Durdona”, and 49.5–53 g in “Zilola”. Based on these findings, it is recommended to sow mung bean at earlier dates in repeated cropping systems to ensure higher productivity. The purpose of this study is to determine and compare the laboratory seed germination of two mung bean varieties and two breeding lines.

**Materials and methods.** The experiment was conducted under laboratory conditions. The study involved two mung bean varieties, Durdona and Osiyo, as well as two breeding lines, VI-060020 A-G and VI-062909. The experiment was arranged in three replications, with 15 seeds used in each replication.

Seed germination was determined in accordance with the rules of the International Seed Testing Association (ISTA) [2; p. 72]. The seeds were placed on moistened filter paper in Petri dishes and observed for 8 days at a temperature of 25 ± 2 °C. Throughout the experiment, moisture was consistently maintained.

The germination rate was calculated using the following formula

$$\text{Germination}(\%) = \frac{\text{The numer of germinated seeds}}{\text{the number of total seeds}} x100\ \%$$

The obtained data were processed and compared across varieties and lines.

**Results.** The results of the laboratory experiments demonstrated significant differences among the mung bean varieties and lines. The Durdona variety (91.90%) and the VI-062909 line (92.57%) exhibited high germination rates and were classified as belonging to the first category. This indicates that the seeds of these variety and line have maintained good quality parameters and possess biologically active seeds. The Osiyo variety (88.06%) and the VI-060020 A-G line (83.68%) were classified into the second category, demonstrating a moderate level of seed germination. This may be attributed to factors such as the physiological maturity of the seeds, storage conditions, or their genetic characteristics.

In general, the varieties and lines that demonstrated higher germination rates possess advantages for breeding and seed production, and it is expected that they will also perform well under field conditions. Based on the results, it is concluded

that mung bean varieties and lines should be evaluated not only under laboratory conditions but also through field experiments across different agro-ecological environments.

**Conclusion and recommendations.** The results of the laboratory studies showed that the Durdona variety and the VI-062909 line demonstrated high germination rates and were identified as promising in terms of seed quality. In contrast, the Osiyo variety and the VI-060020 A-G line exhibited average germination performance.

The findings confirm that applying high-germination varieties and testing them in large-scale field trials will further enhance the efficiency of mung bean cultivation. Moreover, the use of promising seeds will accelerate breeding activities and contribute to the development of high-quality planting material within the seed production system.

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