

Eureka Journal of Agricultural Science & Bio-Innovation (EJASB)

ISSN 2760-4969 (Online) Volume 2, Issue 5, May 2026



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ASSESSMENT OF SEED EMERGENCE PERIODS AND INITIAL DEVELOPMENT OF GUAR — *CYAMOPSIS TETRAGONOLOBA* (L.) TAUB. UNDER RAINFED CONDITIONS OF GALLAOROL DISTRICT, JIZZAKH REGION

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Abstract

The article describes the introduction of guar — *Cyamopsis tetragonoloba* (L.) Taub. seed material into a field experiment, the sowing scheme, and emergence periods under the rainfed conditions of Gallaorol district, Jizzakh region. Guar seed material obtained from the Research Institute of Plant Genetic Resources was selected as the research object. The field experiment was established on 28 April 2026 on a total area of 120 m², in two replications, with a row spacing of 76 cm. Based on published data, the calculated 1000-seed weight was accepted as 32.8 g and the seeding rate as 15 kg ha⁻¹; accordingly, the calculated amount required for the experimental area was determined as 180 g, or approximately 5488 seeds. Initial seedlings were observed 3–5 days after sowing, while mass emergence was observed 12–14 days after sowing. The preliminary data obtained provide a methodological basis for assessing the initial development of guar under rainfed conditions through subsequent phenological and morphometric observations.

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Keywords: Guar, *Cyamopsis tetragonoloba*, rainfed conditions, introduction, seed material, emergence, seeding rate, Jizzakh region.

Abstract

The article presents the establishment of a field experiment and the emergence period of guar — *Cyamopsis tetragonoloba* (L.) Taub. under rainfed conditions of Gallaorol district, Jizzakh region. Seed material obtained from the Research Institute of Plant Genetic Resources was used as the study object. The field experiment was established on 28 April 2026 on a total area of 120 m² in two replications with a row spacing of 76 cm. Based on published data, the calculated thousand-seed weight was accepted as 32.8 g and the seeding rate as 15 kg ha⁻¹. Accordingly, the calculated seed amount for the experimental area was 180 g, corresponding to approximately 5488 seeds. Initial emergence was observed 3–5 days after sowing, while mass emergence occurred within 12–14 days. These preliminary observations provide a methodological basis for subsequent phenological and morphometric assessment of guar under rainfed conditions.

Keywords: guar, *Cyamopsis tetragonoloba*, rainfed conditions, introduction, seed material, emergence, seeding rate, Jizzakh region.

Introduction

The limitation of water resources, the increasing occurrence of drought events, and the strong dependence of crop productivity on climatic factors in rainfed farming areas increase the need to study new, ecologically adaptable plant species. The introduction of economically valuable crops capable of successfully completing the growing season in areas cultivated solely on the basis of natural precipitation and adaptable to moisture deficiency is one of the important scientific and practical tasks.

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Guar — *Cyamopsis tetragonoloba* (L.) Taub. is an annual leguminous plant belonging to the Fabaceae family, and its accepted scientific name is given in precisely this form in modern taxonomic sources [1]. The natural distribution area of the species is associated with India, Pakistan and the Western Himalaya, and it is characterised as a promising crop cultivated under arid and semi-arid conditions [1, 2].

The practical importance of guar is determined by the galactomannan — guar gum — accumulated in the seed endosperm. This polysaccharide is used as a thickening and stabilising agent in the food, pharmaceutical and technical industries. At the same time, owing to its thermophilic nature, developed root system and ability to grow under moisture-limited conditions, guar is regarded as an alternative crop for arid regions [2, 3].

Experiments conducted under semi-arid conditions have shown that the phenological development, plant height, grain yield and guar gum content of guar vary depending on sowing date, plant density and ecotype. Mahdipour-Afra and co-authors studied two guar ecotypes at different sowing dates and at densities of 13, 20 and 40 plants/m², and reported that sowing date and plant density had a significant effect on productivity traits [2]. Contemporary reviews of the drought response of guar have also emphasised that stress tolerance depends on genotype and that initial material must be evaluated under field conditions in new regions [4].

Some preliminary studies on guar have been conducted in Uzbekistan. In particular, materials have been published on the morphological traits of the plant and the biochemical properties of its seeds, as well as on its study as a second crop under local conditions [5, 6]. However, data on the field emergence and initial development characteristics of guar seed material in the rainfed areas of Jizzakh region remain limited.

The aim of the study is to assess the sowing parameters, emergence periods and initial development of guar seed material obtained from the Research Institute of

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Plant Genetic Resources under the rainfed conditions of Gallaorol district, Jizzakh region.

The study is being conducted in 2026 on a rainfed land area in Mingbuloq village, Guliston QFY, Gallaorol district, Jizzakh region. Seed material of guar — *Cyamopsis tetragonoloba* (L.) Taub., a plant belonging to the legume family — Fabaceae, obtained from the Research Institute of Plant Genetic Resources, was selected as the research object.

A total of 1500 g of guar seed material was obtained from the Institute. The field experiment was established on 28 April 2026. The experiment consisted of two replications, with an area of 60 m² in each replication and a total experimental area of 120 m², or 0.012 ha. The seeds were sown with a row spacing of 76 cm using an eight-row arrangement scheme.

Because the 1000-seed weight of this seed lot had not been determined under laboratory conditions before sowing, the mean value reported in the literature was used in the calculations. In a study conducted by Kumari and co-authors on 16 guar genotypes, the 1000-seed weight ranged from 29.0 to 36.3 g, with an overall mean value of 32.77 g [3]. On this basis, the calculated 1000-seed weight for the present study was accepted as 32.8 g.

In accordance with scientific recommendations for cultivating guar under arid and rainfed conditions, a seeding rate of 15 kg ha⁻¹ was accepted in the experiment [7]. Since the total experimental area was 120 m², i.e., 0.012 ha, the calculated seed amount for this area was set at 180 g. Because the experiment was organised in two replications, 90 g of seed material was allocated to each 60 m² replication.

Literature data on the 1000-seed weight of guar genotypes were used to determine the quantitative characteristics of the seed material. Since scientific sources report this indicator to be approximately 32.8 g on average, this value was accepted in the experiment as the calculated 1000-seed weight [3]. On this basis, the 180 g of seed material sown over the total experimental area was calculated to correspond

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to approximately 5488 seeds, while the 90 g of seed material used in each replication was calculated to correspond to approximately 2744 seeds. These indicators are not actual values determined for the seed lot under laboratory conditions, but calculated values accepted on the basis of published data.

Phenological observations were organised in accordance with the field-observation approach applied to guar by Mahdipour-Afra and co-authors [2]. Initial seed emergence and the period of mass emergence were regularly monitored in the experiment. Initial seedlings were recorded 3–5 days after sowing, i.e., on 1–3 May 2026, whereas mass emergence was recorded after 12–14 days, i.e., on 10–12 May 2026.

At the subsequent stages of the experiment, seedling density will be determined by directly counting the plants present within the area of each replication. Plant survival will be assessed by comparing the number of seedlings recorded during the initial mass-emergence period with the number of plants remaining at subsequent observation dates. In addition, plant height, number of true leaves, branching characteristics, onset of flowering, pod formation and seed maturation period will be recorded during the growing season.

In the mathematical and statistical processing of the observational data obtained, mean values for the two replications, their variability and standard error indicators will be determined. Once a sufficient amount of observational data has been accumulated during the growing season, the relationships between phenological development and morphometric traits will be assessed using correlation analysis.

Establishment of the experiment and calculated sowing parameters. The field experiment aimed at assessing guar seed material under the rainfed conditions of Gallaorol district, Jizzakh region, was established on 28 April 2026. The total experimental area was 120 m² and was divided into two replications. Establishing a row spacing of 76 cm provides conditions for plant development during the growing season and for conducting subsequent biometric observations.

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When the seeding rate was accepted as 15 kg ha⁻¹ and the calculated 1000-seed weight as 32.8 g, the calculated seed amount for the total area was 180 g. This amount corresponds to approximately 5488 seeds, or 45.7 seeds/m² per unit area.

Table 1 Calculated sowing parameters of the guar field experiment

Indicator	First replication	Second replication	Total
Area, m ²	60	60	120
Area, ha	0.006	0.006	0.012
Row spacing, cm	76	76	76
Seeding rate, kg/ha	15	15	15
Calculated seed amount, g	90	90	180
Calculated 1000-seed weight, g	32.8	32.8	32.8
Calculated number of seeds, seeds	2744	2744	5488
Calculated seed density, seeds/m ²	45.7	45.7	45.7

In a study conducted by Mahdipour-Afra and co-authors in a semi-arid region of Iran, guar was evaluated at plant densities of 13, 20 and 40 plants/m². The authors found that plant density and sowing date had a significant effect on phenological development, plant height and yield [2]. In comparison with that study, the calculated sown seed density in the experiment under the rainfed conditions of Jizzakh region was 45.7 seeds/m², whereas actual plant density will be formed depending on field emergence and seedling survival. Therefore, a final conclusion will be drawn after the seedlings have been actually counted.

Seed emergence periods. Initial emergence of guar seeds in the experimental field was observed 3–5 days after sowing. Given that the sowing date was 28 April 2026, the appearance of initial seedlings corresponded to 1–3 May. Mass emergence was recorded 12–14 days after sowing, i.e., on 10–12 May.

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Table 2 Emergence periods of guar seeds under rainfed conditions

Phenological indicator	Duration after sowing, days	Calendar date
Sowing date	—	28.04.2026
Appearance of initial seedlings	3–5	01–03.05.2026
Mass emergence	12–14	10–12.05.2026

The initial and mass emergence periods of guar indicate the capacity of the seed material to initiate vegetation under rainfed conditions. However, the rate of emergence does not fully determine the subsequent adaptation or productivity of the plant. Under rainfed conditions, seedling survival, the rate of vegetative development, transition to the flowering and pod-setting phases, and seed maturation are the principal criteria for subsequent assessment.

Studies summarising the drought response of guar have reported that water deficiency affects the physiological activity of the plant, biomass accumulation and productivity indicators, and that this effect varies depending on genetic characteristics [4]. In this respect, the consistent continuation of observations throughout the growing season under the rainfed conditions of Gallaorol district is important for assessing the potential adaptation to local conditions of the seed material obtained from the Research Institute of Plant Genetic Resources.

Indicators for subsequent observations. At the next stage of the experiment, seedling density and morphometric parameters will be recorded in order to quantitatively assess the initial development of the plants. For this purpose, the number of existing seedlings will be counted in both replications, and the mean density will be determined in plants/m². In addition, plant height and number of true leaves will be measured in randomly selected plants.

Conclusion

A field experiment aimed at studying guar — *Cyamopsis tetragonoloba* (L.) Taub. seed material was established on 28 April 2026 on a rainfed land area in Mingbuloq village, Guliston QFY, Gallaorol district, Jizzakh region.

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Guar seed material obtained from the Research Institute of Plant Genetic Resources was selected as the research object. The experiment was arranged in two replications on a total area of 120 m² with a row spacing of 76 cm.

Based on published data, the calculated 1000-seed weight was accepted as 32.8 g and the seeding rate as 15 kg ha⁻¹. On this basis, it was determined that the experimental area required a calculated amount of 180 g, or approximately 5488 seeds.

Under rainfed conditions, initial seedlings of guar were observed 3–5 days after sowing, while mass emergence was observed after 12–14 days. This indicates the ability of the seed material to initiate vegetation under these conditions.

To fully assess the adaptation of guar to rainfed conditions, observations on seedling density, plant survival, morphometric traits, flowering and pod-setting periods, and seed productivity must be continued at subsequent stages.

References

1. Plants of the World Online. *Cyamopsis tetragonoloba* (L.) Taub. Royal Botanic Gardens, Kew. Electronic resource. Accessed: 24.05.2026.
2. Mahdipour-Afra M., AghaAlikhani M., Abbasi S., Mokhtassi-Bidgoli A. Growth, yield and quality of two guar (*Cyamopsis tetragonoloba* L.) ecotypes affected by sowing date and planting density in a semi-arid area // PLOS ONE. — 2021. — Vol. 16, No. 9. — Article e0257692. DOI: 10.1371/journal.pone.0257692.
3. Kumari A., Chaurasia A.K., Pandey A.K. Studies on seed quality parameters in cluster bean [*Cyamopsis tetragonoloba* (L.) Taub. — guar] // Journal of Pharmacognosy and Phytochemistry. — 2020. — Vol. 9, No. 4. — P. 3311–3315.
4. Vishnyakova M.A., Frolova N., Frolov A. Drought stress response in guar (*Cyamopsis tetragonoloba* (L.) Taub.): Physiological and molecular genetic

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<https://eurekaopenaccess.com/index.php/7>

- aspects // Plants. - 2023. - Vol. 12, No. 23. - Article 3955. DOI: 10.3390/plants12233955.
5. Xamrayev N.U., Ziyayev Z.M., Rajabova N.R. Morphological traits of the guar (*Cyamopsis tetragonoloba* L.) plant and biochemical properties of its seeds // Bulletin of the Khorezm Mamun Academy. - 2025. - No. 6/1. - P. 124–126.
 6. Rasulov M.B., Allanazarova L.R., Rasulov M.B. Results of studying the new plant guar (*Cyamopsis tetragonoloba* (L.) Taub.) as a second crop under local conditions. - 2024. DOI: 10.5281/zenodo.14160249.
 7. Singh R. Improved Cultivation Practices for Clusterbean in Kharif and Summer Seasons. - Jodhpur: Central Arid Zone Research Institute, 2014. - P. 1–8.