

Study Of the Agrobiologically Characteristics of Chickpea Varieties

Oserbaeva T.

Professor, Department of Crop Production, Forestry and Landscape Design, Candidate of Agricultural Sciences, Uzbekistan

Kunakbaev N.

Second-year Basic Doctoral Student, Institute of Agriculture and Agrotechnology's, Uzbekistan

Received: 28 October 2025; **Accepted:** 22 December 2025; **Published:** 29 December 2025

Abstract: To study the agrobiological characteristics of chickpea, the varieties "Polvon" and "Iftikor" were sown during the first, second, and third decades of April. To determine the characteristics of the progression of vegetation phases, field germination and growth and development periods were analyzed. The experiment demonstrated that plant height and growth dynamics of chickpea varieties are directly dependent on the biological characteristics of the plants and environmental factors. It was also established that sowing dates have a significant effect on the growth and development of chickpea varieties.

Keywords: chickpea, varieties, sowing dates, April, decade, field germination.

Introduction: Among grain legume crops, chickpea occupies an important position, and in recent years interest in chickpea cultivation has increased in the Republic of Uzbekistan. The costs associated with chickpea protein production are relatively low, while yield per hectare is high. Chickpea protein is used in the food industry to produce environmentally friendly products. Fields cultivated with chickpea improve soil fertility by enriching the soil with biologically fixed nitrogen and enhancing soil microflora.

Under current global conditions of protein deficiency, the presence of 19–33% protein in chickpea grain is of great importance and further increases its nutritional value. The expansion of chickpea production can help address protein deficiency issues. In addition, due to the activity of nitrogen-fixing root nodule bacteria, soils cultivated with chickpea can accumulate 50–70 kg ha⁻¹ of biological nitrogen.

Materials And Methods

The object of the study was chickpea (*Cicer arietinum* L.), represented by the varieties "Polvon" and "Iftikor". Field experiments were conducted during 2024–2025 at the experimental field of the Karakalpakstan Institute of Agriculture and Agrotechnologies. The experiment was arranged using a systematic design

with four replications.

Three main factors were investigated: variety, sowing date, and seeding rate. Sowing was carried out on April 5, 15, and 25. Additional fertilization was applied during the branching and budding stages. Irrigation was performed twice: the first before the budding stage and the second during the pod formation stage.

The growth and development characteristics of chickpea varieties were studied according to the methodologies of field experiments (UzPITI, 2007) and Dospekhov (1985).

During the experiment, the following observations were conducted:

- 1) Growth and development phases of chickpea varieties were recorded, including emergence, branching, budding, flowering, pod formation, and maturity.
- 2) Laboratory seed germination and germination energy were determined using sand as a substrate under constant temperature conditions (20 °C). Germination was assessed twice: first for germination energy and then for total germination.
- 3) Plant density was determined at the end of the emergence phase and before harvest.

4) Plant height was measured during emergence, flowering, and pod formation stages.

5) Leaf number and leaf area were measured during emergence, flowering, and pod formation stages.

6) Yield component analysis included branching intensity, height of the first pod, number and weight of pods and seeds, and 1000-seed weight.

7) Grain yield was determined by harvesting pods from selected plants and measuring seed weight.

Phenological observations were conducted throughout the growing season. The beginning of a phase was recorded when 25% of plants reached the corresponding stage, and full completion was recorded at 75%.

Laboratory and field germination, as well as plant survival, were determined at full maturity. Leaf area dynamics from emergence to maturity were determined according to the method of A.A. Nichiporovich (1969). Dry matter accumulation was determined using the drying method. Measurements were taken every 10 days starting from full emergence, based on three replications of ten plants per treatment.

Grain yield was calculated after adjusting seed moisture to 14% and purity to 100%. Yield structure analysis was conducted according to state variety testing methodologies.

Results And Discussion

Laboratory germination represents the percentage of normally germinated seeds in the analyzed sample and reflects both sowing quality and yield potential. In this study, first-class seed material was used. According to the VIR methodology, a high proportion of well-developed seedlings was observed, which positively influenced field germination. The difference between laboratory and field germination averaged 8–11%.

Lower field germination compared to laboratory conditions is explained by differences in environmental conditions during seed emergence. Under laboratory conditions at 20–22 °C, chickpea seeds began to germinate within 5–6 days.

When chickpea varieties were sown in spring, emergence and plant density were found to depend on varietal biological characteristics, sowing dates, and seeding rates. In 2024, unfavorable weather conditions negatively affected chickpea growth. In 2025, when 60, 70, and 80 kg ha⁻¹ of seeds were sown on April 5, plant density at the emergence stage was 81.0–86.0% for the “Iftikor” variety and 80.0–83.0% for the “Polvon” variety. When sown on April 15, plant density was 76.0–77.0% for “Iftikor” and 75–76% for “Polvon”. When sown on April 25, plant density decreased to 71–74% for “Iftikor” and 71.0–73.0% for “Polvon”. Delayed

sowing and increased seeding rates resulted in reduced plant density.

Field germination followed a similar trend. When sown on April 5, field germination reached 89.0–90.0% for “Iftikor” and 75.8–89.7% for “Polvon”. When sown on April 15, germination decreased to 75.0–78.5% for “Iftikor” and 72.4–77.7% for “Polvon”. The lowest values were observed for April 25 sowing.

The results indicate that both varieties were well adapted to local soil and climatic conditions. However, “Iftikor” consistently showed higher field germination and better plant survival. Delayed sowing resulted in reduced branching, lower placement of the first pod, and decreased number and weight of pods and seeds.

Conclusions

Based on the analysis of experimental data, the following conclusions were drawn:

1. Chickpea varieties showed high plant survival, with survival rates of 95–98% across all treatments.
2. Seeding rates influenced plant development and vegetation period duration; as plant density increased, the vegetation period was prolonged by 1–2 days.
3. Sowing dates significantly affected biometric traits. Delayed sowing led to lower placement of the first pod, reduced branching, and decreased number and weight of pods and seeds.

References

1. Atabaeva X., Oserbayeva T. Crop Science. Tashkent: Fan va texnologiyalar, 2018.
2. Oserbayeva T. Technology of Chickpea Cultivation in Karakalpakstan. Nukus, 2024.
3. Khamdamov I.Kh., Shukurullaev P.Sh., Mustanov S.B. Chickpea under irrigation. Agriculture of Uzbekistan, 1990.
4. Yuldasheva Z. Methods and seeding rates of chickpea on irrigated lands of Uzbekistan. Agrarian Science, 2001.