

## ANNOTATION

**dissertation work of Abildaeva Jyldyz Bakayevna on the topic: " To develop varietal technology of peas in the conditions of south – east of Kazakhstan " submitted for the degree of Doctor of Philosophy PhD in the educational program 8D08101 - "Agronomy"**

**1. Relevance of the research topic** Peas are one of the most valuable food legumes, grown primarily for their grain, which contains over a third of the plant 's protein. Pea protein contains essential amino acids. Peas also possess another valuable property: they do not accumulate harmful or toxic elements (nitrates, radionuclides, etc.). This makes them a highly productive, environmentally friendly crop that can be grown anywhere on the planet .

Pea seeds are a valuable feed for livestock. Like green legumes, they are used as livestock feed . Including peas in animal diets significantly reduces feed consumption, increases livestock yield, and lowers production costs. The average digestible protein content in peas is 22.5%. Per unit of feed, peas contain 170 g of digestible protein, compared to the zootechnical standard of 120 g, making them a valuable protein donor in compound feed . to the diet included peas seeds every 2.5 tons of concentrate are saved per ton.

Peas are perennial herbaceous plants in the legume family . The stems reach 250 cm in length and are adorned with tendrils that help the plant maintain its upright position. The plant does not require pollination by bees and blooms sparingly, producing predominantly white flowers, both male and female. The fruit is a dicotyledonous legume with pea-like seeds. Each pod contains 4 to 8 seeds.

Peas are a legume crop widely grown in many countries worldwide. Peas are used as food, feed, and in the canning industry to produce green beans. They also make a good green manure crop. Furthermore, peas play a significant role as a cover crop, synthesizing nitrogen from the air in symbiosis with nodule bacteria and releasing it for the next crop. Including peas in crop rotation improves soil fertility, as they accumulate up to 130 kg of nitrogen per hectare through the symbiotic activity of nitrogen-fixing microorganisms.

In Kazakhstan, horse beans are grown mainly in the north of Kazakhstan (Akmola, Kostanay, North Kazakhstan regions) on areas of 100-110 thousand hectares. The main advantage of chickpeas is their high protein content.

At the current stage of selection, the technology of pea cultivation is also developing in parallel. Especially peas diversity technologies. Chickpeas growing

agrotechnical methods development Allows for the fullest exploitation of the potential of promising varieties. Improving pea cultivation technology is key to expanding planting areas, increasing yields, and improving overall productivity.

When growing peas, special attention is paid to yield formation depending on the variety, seeding rate, sowing methods, and the amount of mineral fertilizers. Our research is aimed at studying these technological elements as they apply to new varieties. The primary objective of our work is to determine the parameters of key agricultural practices (seeding rates, planting patterns, and mineral fertilizer application rates) when growing the Aksary and Zhasylai food pea varieties recommended for cultivation in Kazakhstan, as well as the seeds whose passport data determine the composition of the peas recommended for cultivation. The primary objective of our work is to determine varietal technologies, specifically seeding rates, sowing methods, and mineral fertilizer application rates on irrigated lands when growing the new Aksary and Zhasylai pea varieties. Our research focuses on new varieties recommended for cultivation in various regions of Kazakhstan, new forage varieties bred by KazEKhZhNII LLC—Aksary, and the Zhasylai variety for use in the canning industry for the production of green peas. The goal of our research is to determine seeding rates, sowing dates, and the application of mineral fertilizers for peas.

The studies were conducted from 2021 to 2024 in field laboratories under irrigated farming conditions at the Kazakh Research Institute of Agriculture and Plant Growing.

**2. The purpose of this dissertation** is to determine the key parameters of seeding rates, seeding method patterns, and varietal-specific agronomic practices for mineral fertilizers when cultivating new pea varieties to achieve maximum yields.

**3. Studying basic tasks:**

- Determination of the seeding rate of new varieties of horse beans Aksary and Zhasylay under irrigated conditions;
- To develop the most optimal sowing patterns to obtain high yields of the studied varieties;
- Determination of optimal doses of fertilizers when growing new varieties of horse beans (Aksary, Zhasylay);
- Comparative study of the productivity of new varieties of horse beans (Aksary, Zhasylay), the influence of sowing patterns and doses of mineral fertilizers, optimal seeding rates for obtaining high yields and good quality of horse bean seeds;
- Determination of economic efficiency of seeding rates, seeding patterns and application of mineral fertilizers in growing horse beans .

#### **4. Research methods :**

The research methods included experimental and laboratory studies. This is a prospective study using laboratory, field, and production methods. Product structure elements were studied by selecting plots before harvesting each treatment, in duplicate. The average number of pods per plant and the number of seeds per pod (AUP) were calculated and recorded. The mass of 1000 seeds was determined according to the MZOS, statistical data processing was carried out according to the method of B. A. Dospekhov.

New varieties of horse beans, Aksary and Zhasylay, were used as source material for the study.

The following agricultural practices were considered :

- 1) Sowing size (A factor) - 600,700,800;
- 2) Vaccination method (B factor) - row interval 15 cm, row interval 30 cm;
- 3) The amount of mineral fertilizers applied (C-factor) - NPK<sub>30</sub> , NPK<sub>60</sub> , NPK<sub>80</sub> .

Research methods included experimental and laboratory studies. The program's research and control experiments were conducted using B.A. Dospekhov's methodology. The study involves laboratory, field, and industrial research.

The product structure elements were studied by selecting sample plots before harvesting each variant, in duplicate. The average number of pods per plant and the number of seeds per pod were calculated and recorded (RAS guidelines). The 1,000-seed weight was determined from the safety data sheet, and statistical data processing was performed using B. A. Dospekhov's method.

Chickpeas technology in accordance with research verified Phenological observations of the main phases of plant growth and development, calculations are carried out in accordance with the methodological guidelines of the BRGI, the methodological guidelines of the MCC, in case of damage by diseases and pests in the natural background - according to the adopted methodology of the State Committee for Ecology of the Republic of Kazakhstan commission Use. Structural analysis was conducted based on the main economically valuable traits and properties. Before harvesting the plots, a structural plot was selected from the sample plots. The yield of the varieties tested in the laboratory analysis The following structural elements are taken into account: plant height, grains quantity, number of pods per plant, number of seeds per pod and plant, weight of seeds per plant, weight of 1000 seeds.

Quality indicators: Quality assessment methods. Crude protein content according to International Standard 13496.4. Physical properties of grain, as well as its solubility in pea samples, taste, and technological qualities of grain. The evaluation laboratory identified MZOS 6201-68, MZOS 51074-97 and MZOS 8756-76.

## **5. For protection proposed basic principles**

- When growing peas, the optimal seeding rates, sowing times and application of mineral fertilizers are:
- For the purposes of use, varieties of horse beans were identified based on their economic value;
- Performance receiving most big influence seed the sowing was the size .

## **6. Studying basic results description**

An analysis of literature by various authors revealed that the use of various agricultural practices to achieve high bean yields is significantly influenced by natural and climatic conditions, water regimes, and the response of new varieties to agricultural factors. All of this is of interest for studying the impact of agricultural practices on the growth and development of new bean varieties under controlled irrigation conditions.

## **7. Justification of the novelty and significance of the obtained results**

For the first time in Kazakhstan, optimal parameters for varietal technology under irrigated conditions and their impact on the economic value and productivity of new varieties will be determined to achieve high yields and product quality.

**8. Correspondence of the research to development areas or state programs.** The dissertation was completed within the framework of the state program of the Ministry of Agriculture of the Republic of Kazakhstan . to me project (2021-2023 (year) within the framework "Kazakh" agriculture Research Institute of Plant Breeding and Crop Production LLC: - ZTN BR 10765000 "Creation of highly productive varieties and hybrids of grain and legume crops based on achievements in biotechnology, genetics, physiology and biochemistry of plants, their implementation in various regions of Kazakhstan" for sustainable production in soil and climatic zones"; ZTN BR 22885414 "Creation of high-yielding varieties of grain and leguminous crops based on modern biological methods, development of their varietal technology and primary seed production" (2024-2026) . ).

**9. Description of the doctoral student's contribution to the preparation of each publication** During her dissertation research, doctoral student Abildaeva Jyldyz Bakayevna took a responsible approach to her research, developed the research program and methodology, and contributed personally to the planning and execution of experiments. She completed the research assignments with great enthusiasm. Based on the results of the dissertation research, four scientific articles were published, including: one in a popular science journal in the Scopus information and abstract database; three in domestic publications recommended by the Committee for Control in the Sphere of Education and Science of the Ministry of Education and Science of the Republic of Kazakhstan; one is an additional author of a patent for a utility model of the Republic of Kazakhstan.

**Published in publications recommended by the Committee for Quality Assurance in Education and Science of the Ministry of Education and Science of the Republic of Kazakhstan :** Bulletin of Kyzylorda University named after Korkyt Ata "Agricultural Sciences" No. 1 (64) 2023. P. 114-12 <https://doi.org/10.52081/bkaku.2023.v64.i1.011> ; Research, Results – Research, Results. No. 2 (2-1) 2024, ISSN2304-3334 pp. 15-24 <https://doi.org/10.37884/2-1-2024/535> ; Research, results – Research, results. No. 2 (2-1) 2024, ISSN2304-3334 pp.172-180 <https://doi.org/10.37884/2-1-2024/552> .

**Approbation.** The main results of the dissertation research were presented and discussed at international and national scientific conferences and round tables, including: at the round table “History and Modernity: Agricultural Research in the Field of Agriculture and Crop Production”, dedicated to the 90th anniversary of the Kazakh Research Institute of Agriculture and Crop Production (Almalybak, 2024);

**Volume and structure of the dissertation.** The total length of the dissertation is 1.35 pages . It consists of an introduction, 5 parts, a conclusion, and a proposal for further development. The dissertation contains 12 figures, 13 tables, and 3 appendices. The list of references includes 115 reference