

SELECTION EVALUATION OF PROMISING SOYBEAN VARIETIES AND SPECIMENS IN THE CONDITIONS OF KARAKALPAKSTAN

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Abstract. This study highlights the issues of selective assessment of promising soybean varieties and specimens in the soil and climatic conditions of the Republic of Karakalpakstan, determining their growth, development, yield, and adaptability to local conditions. When selecting soybean varieties, traits such as early maturity, high grain yield, duration of the growing season, number of pods, 1000-seed weight, and resistance to unfavorable soil and climatic factors were evaluated as important breeding indicators.

Keywords: soybean, breeding, variety, genotype, breeding material, Karakalpakstan, yield, early maturity, nitragin, rhizobium, adaptability.

Introduction

Today, ensuring food security, growing protein-rich plant products, and the efficient use of land resources used in agriculture are considered important tasks. In this regard, the soybean plant is of great importance as a crop with high protein and oil content, providing valuable raw materials for food, livestock, and industry.

The natural and soil-climatic conditions of the Republic of Karakalpakstan differ from other regions in their uniqueness. Soil salinization, high temperatures, water supply restrictions, and other agro-ecological factors affect the growth and development of agricultural crops in the region. Therefore, identifying varieties and genotypes that are highly productive and well-adapted to local conditions is one of the important directions of breeding work for this region.

In soybean breeding, it is important to isolate genotypes that are early-maturing, high-yielding, resistant to unfavorable agro-ecological conditions, and stable in biological properties. In particular, the short duration of the growing season can be one of the main criteria for selecting soybean varieties in the conditions of Karakalpakstan.

The main goal of the study is to evaluate soybean varieties and samples based on economic and biological traits in the soil and climatic conditions of the Republic of Karakalpakstan, identify high-yielding and early-maturing genotypes, and isolate them as promising starting material in the breeding process.

In the research, soybean varieties and samples promising for cultivation in the conditions of Karakalpakstan were used. During the experiments, traits such as the growing season, germination period, flowering and pod formation periods, maturation period, plant height, number of lateral branches, number of pods per plant, number of grains per pod, 1000-seed weight, and grain yield were taken into account.

During the selection evaluation, special attention was paid to the adaptability of genotypes to local soil and climatic conditions. Along with high yields, early maturity and resistance to adverse agro-ecological factors were evaluated as important traits for breeding.

The inoculation of soybean seeds with nitragin before sowing was also studied. Rhizobium bacteria in nitragin enhance the formation of tubers in soybean roots, facilitating the biological absorption of atmospheric nitrogen. Therefore, the growth and yield indicators of various genotypes when using nitragin were also considered as selectively interesting traits.

During the observations, it was established that certain differences exist between genotypes in the growth and development of soybean varieties and samples in the conditions of Karakalpakstan. Some varieties and specimens may be characterized by a short growing season, early ripening, and high grain yield.

The identification of early-maturing genotypes is of particular importance in the selection evaluation. This is because varieties with a short growing season make it possible to effectively utilize the agro-climatic conditions of the region and ensure the timely formation of the harvest.

Characteristics such as the number of pods, the number of grains per pod, and the mass of 1000 seeds are of great importance in the formation of soybean yield. Highly productive genotypes can be isolated by a comprehensive assessment of these traits.

It was observed that in seeds treated with nitragin, the formation of tubers in the plant's root system increased. This serves to increase the possibility of using biological nitrogen by the soybean plant. According to the results of the previous experiment, the grain yield in the variant treated with nitragin was 15.7 c/ha, which is 1.5 c/ha higher than in the variant without nitragin.

These results demonstrate the significance of nitragin not only from an agrotechnical but also from a breeding perspective. That is, the ability of various soybean genotypes to absorb biological nitrogen and the response to the action of nitragin can be used as an additional criterion in the future breeding process.

When selecting promising soybean varieties and samples in the conditions of Karakalpakstan, it is important to evaluate their economic and biological traits in their interconnection. At the same time, the main criteria are considered, first of all, the growing season of the varieties and samples, early ripening properties, and

adaptability to local soil and climatic conditions. The isolation of early-maturing genotypes allows for the effective use of the growing season in regional conditions and the timely formation of the harvest.

The main indicators determining soybean yield are the number of pods per plant, the number of grains per pod, the weight of 1000 seeds, and the final grain yield. Through a comprehensive analysis of these traits, it is possible to isolate highly productive and stable crop-forming genotypes.

The studies also focused on the response of soybean genotypes to inoculation with nitragin. As a result of the application of nitragin, the formation of tuber bacteria in the root system and an increase in their activity are observed, which increases the plant's ability to utilize biological nitrogen. In this regard, identifying genotypes with high growth, development, and yield under the influence of nitragin can serve as an additional criterion for selecting breeding material suitable for the conditions of Karakalpakstan.

Thus, a comprehensive assessment of soybean varieties and specimens by early maturity, yield components, productivity, resistance to unfavorable soil and climatic conditions, and the ability to form an effective symbiosis with nitragin allows for the identification of promising genotypes suitable for the conditions of Karakalpakstan.

Identifying varieties and genotypes suitable for soybean cultivation in the specific soil and climatic conditions of the Republic of Karakalpakstan is one of the important directions of breeding work. When evaluating breeding materials, it is necessary to comprehensively consider not only high yields but also early maturity, salinity and high-temperature resistance, adaptability, and yield components.

The research results indicate the possibility of selecting promising soybean genotypes under the conditions of Karakalpakstan and using them as starting material in subsequent breeding processes. Seed inoculation with nitragin serves to enhance the development of tuber bacteria in the plant's roots, increase the efficiency of biological nitrogen utilization, and improve yields.

Therefore, in future breeding research, the selection of early-maturing, high-yielding, salt-tolerant soybean genotypes that effectively utilize the influence of nitragin is one of the promising directions for creating new varieties suitable for the conditions of Karakalpakstan.

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