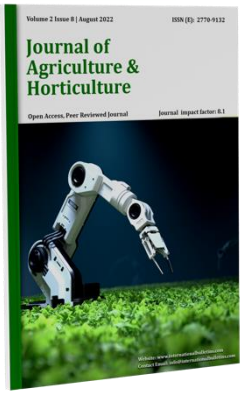

THE SCIENTIFIC BASIS OF GROWING SESAME VARIETIES IN THE CONDITION OF KARAKALPAKSTAN

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Abstract. This article provides an in-depth exploration of the scientific principles and research-backed strategies for cultivating promising sesame varieties in the unique agro-climatic conditions of Karakalpakstan. It delves into key factors such as soil suitability, climate adaptation, drought tolerance, high-yielding traits, and pest and disease resistance, offering vital insights for farmers, researchers, and agricultural stakeholders.

Keywords: Sesame varieties, Karakalpakstan, soil suitability,climate adaptation, drought tolerance, high-yielding traits, agricultural research,crop cultivation, agro-climatic conditions.

Sesame is an important crop in Karakalpakstan, a region in Uzbekistan known for its arid climate and agricultural production. Sesame is a valuable source of income for farmers in the region, as it can be grown with minimal water and input costs [5]. However, traditional sesame varieties have limited yield potential and may be susceptible to pests and diseases. Therefore, it is important to grow promising sesame varieties that are adapted to the local conditions and have higher yield potential. The article explores the characteristics of different sesame varieties, the scientific basis for growing sesame in Karakalpakstan, and the benefits and challenges of growing promising sesame varieties.

There are several varieties of sesame, each with its own unique characteristics. Some of the most commonly grown varieties include:

1. White sesame: This variety is known for its white seeds and is commonly used in cooking and baking.
2. Black sesame: This variety has black seeds and is often used in traditional Chinese medicine.
3. Brown sesame: This variety has brown seeds and is commonly used in Middle Eastern cuisine.
4. Red sesame: This variety has red seeds and is often used in Japanese cuisine.

The growth of sesame varieties is affected by several factors, including soil type, temperature, rainfall, and sunlight. Sesame prefers well-drained soils with a pH range of 6.0-7.5. It grows best in warm temperatures between 25-30°C and requires at least 500mm of rainfall annually or irrigation to ensure proper growth and development. Additionally, sesame requires full sunlight exposure for at least six hours per day to maximize yield potential [2].

Sesame is a warm-season crop that requires well-drained soils with good water-holding capacity. In Karakalpakstan, the soil types suitable for sesame cultivation are sandy loam and loamy soils. These soils are found in the southern and western parts of the region, where the climate is warm and dry. The ideal pH range for sesame growth is between 6.0 and 7.5. Sesame is a drought-tolerant crop and can grow in areas with low rainfall. However, it

requires at least 500mm of annual rainfall or irrigation to ensure proper growth and development. The temperature range suitable for sesame growth is between 25-30°C.

Sesame plants require adequate amounts of nutrients for optimal growth and yield. The main nutrients required by sesame plants are nitrogen (N), phosphorus (P), and potassium (K). In Karakalpakstan, the soil is generally deficient in nitrogen and phosphorus, so fertilization is essential for successful sesame cultivation. The recommended fertilizer application rates for sesame in Karakalpakstan are 60 kg N/ha, 40 kg P/ha, and 60 kg K/ha. The nitrogen fertilizer can be applied in split doses, with the first application at planting and the second application at the flowering stage.

Sesame is susceptible to several pests and diseases that can affect its growth and yield. In Karakalpakstan, the most common pests that attack sesame are aphids, thrips, and whiteflies. The most common diseases that affect sesame are Fusarium wilt, charcoal rot, and leaf spot. To manage pests and diseases in sesame crops, farmers in Karakalpakstan can use integrated pest management (IPM) strategies. These strategies include crop rotation, use of resistant varieties, cultural practices such as planting at the right time, and the use of biopesticides. In conclusion, sesame can be successfully grown in Karakalpakstan if the soil and climate requirements are met, and appropriate pest and disease management strategies are implemented. Proper fertilization is also essential for optimal sesame growth and yield [1].

There are several promising sesame varieties that are suitable for cultivation in Karakalpakstan. These varieties have been developed through breeding programs and have been selected based on their adaptability to the local growing conditions, resistance to pests and diseases, and high yield potential. One of the promising varieties for Karakalpakstan is the Uzbekistan-4 variety. This variety has a high yield potential and is resistant to Fusarium wilt and charcoal rot, which are common diseases in the region. Another promising variety is the Tajikistan-1 variety, which has good drought tolerance and produces high-quality seeds. Compared to traditional sesame varieties grown in Karakalpakstan, these promising varieties have several advantages. Traditional varieties are often low-yielding and susceptible to pests and diseases. In contrast, the promising varieties have been developed to be more resilient and productive, which can result in higher yields and better economic returns for farmers. Additionally, the promising varieties have been bred to have desirable traits such as early maturity, uniformity, and high oil content. These traits can improve the quality of the seeds and make them more marketable. Overall, the adoption of these promising sesame varieties in Karakalpakstan can lead to increased productivity and profitability for farmers, as well as contribute to the development of the local agricultural sector [4].

Benefits of Growing Promising Sesame Varieties include the followings:

Economic benefits for farmers:

- Higher yields and better quality seeds can result in increased profits for farmers.
- Resilient and productive varieties can reduce crop losses due to pests and diseases, leading to more stable incomes.
- Promising varieties with desirable traits such as early maturity and uniformity can improve marketability and increase demand for the seeds.

Health benefits for consumers:

- Sesame seeds are a good source of protein, fiber, and healthy fats.
- Promising varieties with high oil content can produce seeds that are rich in omega-6 fatty acids, which have been linked to improved heart health.

- Sesame seeds also contain antioxidants and minerals such as calcium, iron, and magnesium.

Environmental benefits:

- Promising varieties that are resistant to pests and diseases can reduce the need for chemical pesticides and fungicides, which can be harmful to the environment.

- Sesame is a drought-tolerant crop, which means that it requires less water than other crops. This can help conserve water resources in areas where water is scarce.

- Sesame can also be grown as part of a crop rotation system, which can improve soil health and reduce soil erosion.

Challenges faced by farmers in growing promising sesame varieties:

- Limited access to quality seeds and technical expertise.

- Lack of infrastructure and resources for irrigation, storage, and transportation.

- Climate variability and extreme weather events, such as droughts and floods, can affect crop yields and quality.

- Pest and disease infestations can cause significant crop losses if not managed properly.

- Limited market access and low prices for sesame seeds can discourage farmers from investing in the crop.

Limitations of the scientific basis for growing sesame varieties in Karakalpakstan:

- Limited research on local soil types, water availability, and climatic conditions.

- Lack of data on the performance of different sesame varieties in the region.

- Limited understanding of the interactions between sesame and other crops in rotation systems.

- Limited research on the impact of promising sesame varieties on soil health, biodiversity, and ecosystem services.

- Limited capacity for monitoring and evaluation of sesame production systems [3].

Conclusion. In conclusion, the cultivation of promising sesame varieties has the potential to improve the livelihoods of farmers in Karakalpakstan. However, there are several challenges that need to be addressed, including limited access to quality seeds and technical expertise, lack of infrastructure and resources, climate variability and extreme weather events, pest and disease infestations, and limited market access and low prices for sesame seeds. Additionally, there are limitations in the scientific basis for growing sesame varieties in the region, including limited research on local soil types, water availability, and climatic conditions. Despite these challenges and limitations, we urge farmers in Karakalpakstan to adopt promising sesame varieties as a means of improving their yields, income, and resilience to climate change. This can be achieved through partnerships with agricultural extension services, private sector actors, and research institutions to provide farmers with access to quality seeds, technical expertise, and infrastructure. By working together, we can help unlock the potential of sesame cultivation in Karakalpakstan and contribute to sustainable agricultural development in the region.

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