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Soybean Varieties “Baraka”, “Madina”, And “Nafis” In Uzbekistan: Agronomic Characteristics, Productivity, And Adaptation Potential

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Abstract

Soybean (*Glycine max* L. Merr.) is one of the most important leguminous crops worldwide due to its high protein and oil content. In Uzbekistan, the cultivation of soybean has expanded significantly to improve food security, livestock feed production, and soil fertility. Among locally adapted soybean varieties, Baraka, Madina, and Nafis have attracted considerable attention because of their high productivity and adaptability to irrigated conditions. This review summarizes the biological characteristics, agronomic performance, yield potential, and cultivation prospects of these varieties under Uzbekistan's soil-climatic conditions. The analysis indicates that Baraka demonstrates stable grain yield and drought tolerance, Nafis is characterized by high protein content and adaptability to different ecological zones, while Madina possesses favorable agronomic traits suitable for intensive farming systems. These varieties contribute significantly to sustainable soybean production and agricultural diversification in Uzbekistan.

Keywords: Soybean, *Glycine max*, Baraka, Madina, Nafis, productivity, grain quality, Uzbekistan, legume crops, sustainable agriculture.

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Introduction. Soybean (*Glycine max* L. Merr.) is recognized as one of the most valuable agricultural crops because its seeds contain approximately 35–45% protein and 18–25% oil. The crop plays an essential role in human nutrition, animal feed production, and soil fertility improvement through biological nitrogen fixation. In Uzbekistan, soybean cultivation has become increasingly important as part of agricultural diversification programs and strategies aimed at increasing protein-rich food production.

The successful expansion of soybean cultivation depends largely on the selection of varieties adapted to local environmental conditions. Baraka, Madina, and Nafis are among the varieties cultivated in Uzbekistan due to their promising agronomic performance and economic value.

Literature Review. Research conducted in Uzbekistan has demonstrated that soybean productivity depends on genetic characteristics, sowing dates, irrigation management, nutrient supply, and environmental conditions. Studies on local soybean cultivars have shown considerable variation in growth duration, plant height, pod formation, and grain yield. Nafis has been extensively studied under irrigated and saline soil conditions, where it exhibited stable growth and satisfactory grain production. Optimal sowing during the first decade of April resulted in the highest yields in the Aral Sea region. Similarly, Baraka has demonstrated high productivity and adaptation to irrigated meadow-serozem soils, particularly under water-saving irrigation technologies.

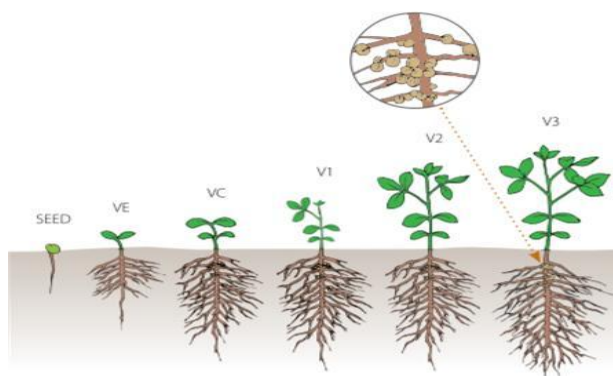
Materials and Methods. This article is based on a comprehensive review and synthesis of scientific publications, state variety descriptions, and agronomic studies conducted in Uzbekistan. Comparative evaluation was performed using indicators including: Vegetation period; Plant height; Seed weight; Grain yield; Adaptability to environmental conditions; Resistance to lodging and seed shattering. Data were compiled from published scientific reports and experimental results obtained under irrigated farming systems.

Results and Discussion. Characteristics of the Baraka Variety. Baraka is a soybean variety developed by the Research Institute of Grain and Leguminous Crops of Uzbekistan. The variety belongs to the medium-maturity group and exhibits good adaptation to irrigated conditions. The average plant height reaches approximately 105 cm, while the vegetation period is around 126 days. Thousand-seed weight averages 150 g, indicating favorable grain size characteristics. Average grain yield has been reported at 36.5 centners ha⁻¹. The variety also demonstrates high resistance to lodging and seed shattering. In addition, Baraka has shown positive responses under drip irrigation technologies, contributing to improved soil agrochemical conditions and efficient water use.

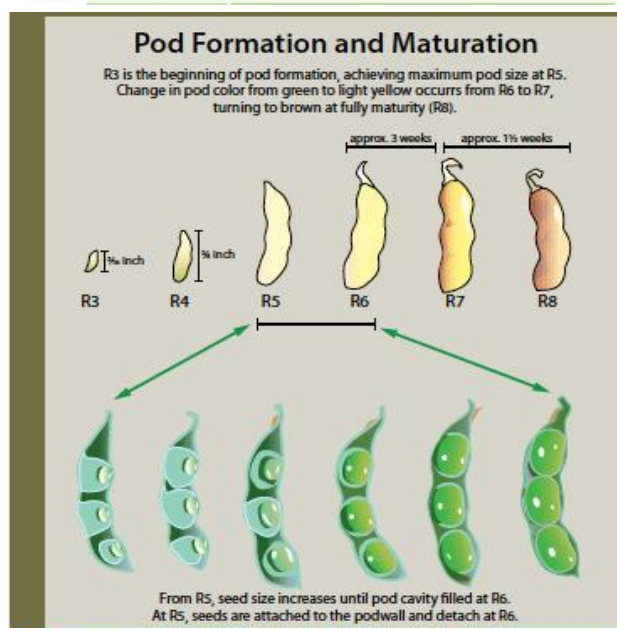
Characteristics of the Nafis Variety. Nafis is one of the most widely studied soybean cultivars in Uzbekistan. The variety was developed through individual plant selection and is characterized by a growth period of 115–125 days. Plant height ranges from 145 to 150 cm, with 120–130 pods per plant under favorable growing conditions. Grain protein content reaches 40–41%, while oil content ranges from 25–27%. Thousand-seed weight varies between 165 and 175 g. Grain yield commonly reaches 30–32 centners ha⁻¹. Field studies indicate that Nafis responds positively to growth stimulants and silicon-containing fertilizers, which enhance plant growth, pod formation, and grain yield. Furthermore, sowing during early April significantly improves yield performance in low-salinity soils of the Aral Sea region.

Characteristics of the Madina Variety. Madina is considered one of the promising local soybean cultivars cultivated under irrigated conditions in Uzbekistan. The variety exhibits good adaptation to local climatic conditions and demonstrates stable productivity. It is characterized by moderate maturity, favorable seed quality, and satisfactory resistance to environmental stresses. Studies on nodulation and biological nitrogen fixation indicate that local soybean varieties possess strong symbiotic relationships with rhizobial bacteria, contributing to improved soil fertility and crop productivity. Madina is particularly suitable for crop rotation systems where soil fertility enhancement and sustainable production are primary objectives.

Figure 1. Different growth and developmental stages of soybean (*Glycine max* L.), from germination to physiological maturity.



SEED	VE	VC	V1	V2	V3, V4...
Average days from planting (range)	10 (7–21)	20 (20–30)	25 (25–30)	30 (30–35)	35 (35–40)



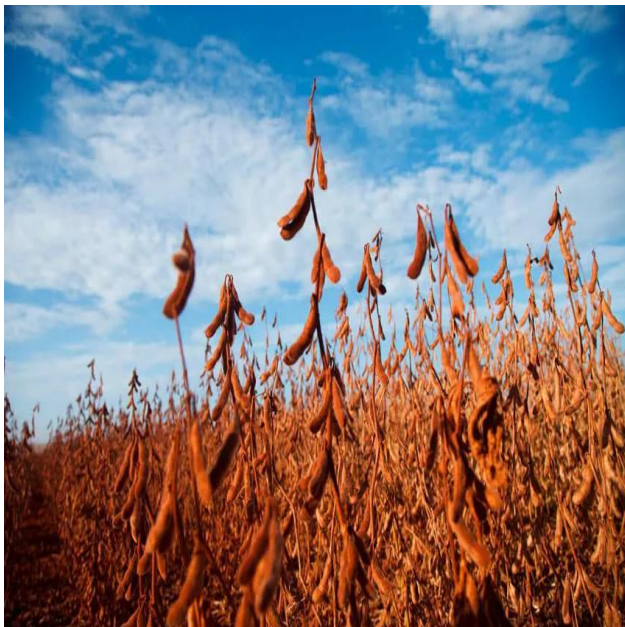


Table 1. Comparative Agronomic Characteristics of Baraka, Madina and Nafis Soybean Varieties

Indicator	Baraka	Madina	Nafis
Maturity group	Medium	Medium	Medium
Vegetation period (days)	126	115–125	115–125
Plant height (cm)	105	100–130	145–150
1000-seed weight (g)	150	150–170	165–175

Protein content (%)	38–40	38–42	40–41
Oil content (%)	20–24	22–25	25–27
Average yield (c ha ⁻¹)	36.5	30–35	30–32
Lodging resistance	High	High	High

Values compiled from regional agronomic studies and comparative assessments. Economic Importance. The cultivation of Baraka, Madina, and Nafis varieties provides multiple economic benefits: Increased production of plant protein. Reduced dependence on imported soybean products. Improvement of soil fertility through nitrogen fixation. Expansion of livestock feed resources. Enhanced sustainability of crop rotation systems. These advantages contribute directly to the modernization and diversification of Uzbekistan's agricultural sector.

Conclusion. Baraka, Madina, and Nafis soybean varieties represent valuable genetic resources for soybean production in Uzbekistan. Baraka is distinguished by its high yield potential and adaptability to water-saving irrigation systems. Nafis demonstrates superior grain quality, high protein content, and stable performance across diverse ecological conditions. Madina possesses favorable agronomic traits and contributes effectively to sustainable agricultural production systems. The continued cultivation and improvement of these varieties will support national food security, livestock development, and environmentally sustainable farming practices.

Conclusion

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