SELECTION OF EARLY-MATURING RICE SAMPLES WITH A SHORT VEGETATIVE PERIOD IN THE CONDITIONS OF KARAKALPAKSTAN

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Annotation. *In this study, a comprehensive and in-depth analysis of the most high-yielding rice varieties belonging to different ecological groups was carried out. Early-maturing samples with short vegetation periods, namely 8-04-8, K-26-20 were selected and recommended for use by breeders.*

Key words: *rice, variety, selection, collection, vegetation.*

Introduction

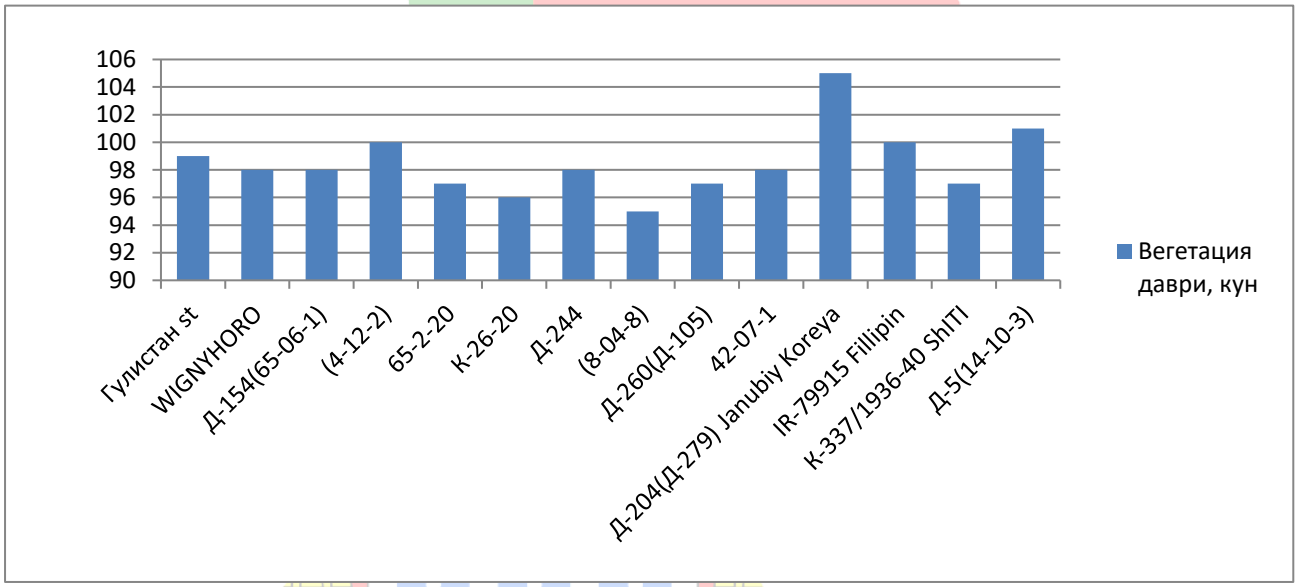
Rice ranks first in the world in terms of yield and second after wheat in consumption. It is a primary food source for one-third of the global population and, despite originating in tropical regions, is widely grown in temperate zones. The world's population is steadily increasing, while the amount of land available for agriculture is decreasing each year, and labor costs are rising. These factors highlight the urgent need to introduce new innovations in agriculture, especially in rice farming. The Republic of Karakalpakstan is a leading region for rice cultivation, with significant potential for large-scale planting. However, the region faces challenges such as poor soil and climate conditions, water shortages, late arrival of irrigation water, increased drought, soil salinization, and extreme heat days. These stress factors significantly hinder the expansion of rice cultivation areas, which is primarily dependent on water availability.

According to B. Abdullayev, U. Abillayev, S. Jalmenova, and D. Turdishev, modern rice breeding in Uzbekistan requires varieties that are not only high-yielding and long-grain for export but also stress-resistant and early-maturing to meet the needs of a rapidly developing economy. [1]

D. Utambetov and G. Khojambergenov's experiments found that the germination period and field germination of seeds are relatively low, ranging from 0.9-3.9 plants/m² and 0.2-0.7%, respectively. The processing coefficient for rice varieties ranges from 1.32 to 1.42%. Based on their data, the early-maturing variety 'Guliston'

matures 4-7 days earlier than other varieties, producing 2-9 kg/ha more yield, and requires approximately 4,500 m³/ha less water. The 'Guliston' variety is recommended for re-planting after winter wheat [2]

According to B. Abdullaev and U. Abillaev, the rice-growing areas of Karakalpakstan are located in the lower reaches of the Amu Darya River, in a sharply continental climate zone on saline desert soils. Much of the irrigated land in northern Karakalpakstan is subject to moderate to severe chloride and sulfate salinization, with



low soil fertility and shallow saline groundwater, making it unsuitable for cotton, wheat, and other crops. The relatively short warm season and diverse natural stress factors, along with the scarcity of irrigation water and its late arrival, significantly limit the expansion of rice cultivation in the region [3]

All these factors underscore the urgent need to develop new rice varieties that are well-adapted to local conditions, with high yield potential and ultra-early maturity suitable for the global market.

Our research aimed to identify highly productive, large-grain rice varieties with positive traits and short vegetative periods from the world rice collection to breed varieties adapted to Karakalpakstan's stressful environmental conditions. To accelerate the breeding of large-grain, stress-tolerant rice varieties in our region, we comprehensively studied the world collection materials under stress conditions and identified resistant donors for use in crossing work using genetic markers.

Materials and Methods

The research was conducted at the experimental fields of the Grain and Rice Scientific-Production Association in Karakalpakstan.

Observations, measurements, and calculations were conducted using generally accepted methods described by A.P. Smetanin [1972] and the Field Experimentation Manual [2007]. Productivity elements were analyzed in laboratory conditions using

model bundles to identify the most productive, ultra-early maturing samples. The data were analyzed using the dispersion method according to B.A. Dospexov.

Results and Discussion

Agrobiological evaluation of collection samples identified forms that combine multiple positive traits and are stress-resistant and fully maturing in the conditions of Karakalpakstan. Special attention was given to their ultra-early maturity (Figure 1).

Figure 1.

Classification of the vegetative periods of the collection samples.

Comparative studies of early maturity against the standard 'Guliston' variety in the republic's conditions showed that some samples, such as WIGNYORO, D-154(65-06-1), 42-07-1, matured in 98 days; 4-12-2 and IR-79915 (Philippines) in 100 days; D-5(14-10-3) in 101 days; and the South Korean variety D-204(D-279) in 103 days. Samples 65-2-20 and D-260(D-105) matured in 97 days, indicating they ripened 4-5 days earlier than the standard variety. Large-grain samples 8-04-8 and K-26-20 also demonstrated this early maturity.

The results confirmed that samples 8-04-8 and K-26-20 are highly promising for breeding due to their early maturity and useful agronomic traits. Other samples, although fully matured, showed lower agronomic performance and a tendency to lodge. The ultra-early maturity, disease resistance, and pest resistance of these selected samples were confirmed in trials. These two samples were selected for use as parental forms in the breeding process in the next year. As a conclusion, we recommend the early-maturing, disease- and pest-resistant samples 8-04-8 and K-26-20 for breeders to develop new varieties in local conditions.

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