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**Effects of Different Sowing Schemes and Nitrogen Fertilizer Rates on
Duration of Vegetation Period of Rice Cultivars**

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Abstract. This article studies the effect of rice nutrition rates and planting scheme on the duration of the rice growing season. In the experiment, when using nitrogen fertilizer rate N_{120} , the accumulation and ripening phases are significantly extended, which causes a delay in the harvest period. The expansion of the planting scheme (from 15×15 cm to 25×25 cm) changes the plant's nutrition area and affects the development phases. For example, in the 25×25 cm scheme, it was observed that the accumulation and ripening processes occur 1-2 days later than in densely planted variants.

Keywords: Rice, nitrogen fertilizer rate, seedling, sowing scheme, duration of the vegetation period.

Introduction. The constant increase in food prices and the decline in quality levels around the world require the intensification of selection, seed production and agrotechnical work in rice farming, further increasing the volume of food production in the republic, increasing their varieties, and more fully satisfying the population's demand for food products. Rice is one of the oldest crops on earth, it is the main source of food for a third of the world's population and, despite its origin in the tropics, is widely distributed in temperate regions. 60 percent of the world's population lives in Asia, and 92 percent of rice is grown in this region. Rice is the main food product for 90 percent of the world's population. In recent years, our republic has been implementing large-scale reforms to develop agriculture. In particular, the Resolution of the President of the Republic of Uzbekistan No. RP-4973 dated February 2, 2021 “On measures for the further development of rice cultivation” stipulates the systematic organization of measures to effectively use land and water resources, increase productivity and production volumes using the scientific foundations of rice cultivation. Based on the above instructions and information, it was decided to conduct research to

determine the optimal feeding rate with mineral fertilizers (NPK) that will ensure high and high-quality yields in the seedling cultivation of rice in the conditions of the Tashkent region.

Results and Discussion. In the Central Asian region, high summer temperatures and limited water resources complicate the development of rice crops. Therefore, it is important to determine the growth and development phases of rice varieties and analyze their phenological characteristics.

The efficiency of rice growth largely depends on the planting scheme and the rate of nitrogen fertilizers [69; pp.77-85]. If the planting scheme dictates the row spacing and number of plants, the amount of nitrogen fertilizers can significantly change the growth rate and development phases. These factors play an important role in controlling different stages of the plant's vegetation period - from seed to germination and to full ripening [82; pp.185-196].

Therefore, this section analyzes the effects of different planting schemes and nitrogen fertilizer application on the growing season of rice varieties, which provides a basis for improving productivity and agrotechnical recommendations.

According to the data in Table 1, in the control variant of the 15x15 cm planting scheme, the feeding rate of $N_{60}P_{60}K_{90}$ kg/ha in the accumulation phase of development was 23 days, while in the standard variety it was 25 days. In the same feeding rate and 20x20 cm planting variant, it was 23 days, while in the standard variety it was 24 days, while in the 25x25 cm planting scheme it was 24 days, while in the standard variety it was 24 days. It was found that the feeding rate of $N_{90}P_{60}K_{90}$ kg/ha in the 15x15 cm planting scheme was 24 days, while in the standard variety it was 25 days, while in the 20x20 cm planting scheme it was 24 days, while in the standard variety it was 24 days, while in the standard variety it was 25 days, while in the standard variety it was 25 days, while in the standard variety it was 26 days. In the variant where $N_{120}P_{60}K_{90}$ kg/ha was used, the duration of the sowing scheme was 25 days, despite the differences in sowing schemes. In the standard variety, the sowing scheme was 26 days at 15x15 cm, 26 days at 20x20 cm, and 27 days at 25x25 cm. It was found that the stem elongation phase in both varieties differed by 2-3 days due to the rapid passage of the stem elongation phase. The feeding rate in the stem elongation phase of development and in all sowing schemes was 7-8 days.

Table 1
Duration of the vegetation period of rice varieties with different sowing schemes and nitrogen fertilizer rates, days (2023-2025)

Feeding rates, kg/ha	Sowing schemes	Developmental phases					
		Seedling	Accumulation	Stem elongation	Panicle formation	Ripening	Duration of vegetation period
Billur							
N ₆₀ P ₆₀ K ₉₀	15×15	30	23	11	7	27	98
	20×20	30	23	12	7	28	100
	25×25	30	24	12	7	28	101
N ₉₀ P ₆₀ K ₉₀	15×15	30	24	12	7	28	101
	20×20	30	24	12	7	29	102
	25×25	30	25	13	7	29	104
N ₁₂₀ P ₆₀ K ₉₀	15×15	30	25	13	8	29	105
	20×20	30	25	13	8	30	106
	25×25	30	25	13	8	30	106
St. Guliston							
N ₆₀ P ₆₀ K ₉₀	15×15	30	24	12	7	29	102
	20×20	30	24	12	7	29	102
	25×25	30	24	12	7	29	102
N ₉₀ P ₆₀ K ₉₀	15×15	30	25	13	7	30	105
	20×20	30	25	13	8	30	106
	25×25	30	26	13	8	30	107
N ₁₂₀ P ₆₀ K ₉₀	15×15	30	26	14	8	32	110
	20×20	30	26	14	9	32	111
	25×25	30	27	14	9	32	112

The ripening phase of the rice variety Billur was 27 days in the variant with 1333 seedlings planted at the rate of nitrogen mineral fertilizers N₆₀, 28 days at 750 seedlings/m², and 28 days at 480 seedlings/m²; the variant with 1333 seedlings planted at the rate of nitrogen mineral fertilizers N₉₀ was 28 days, 29 days at 750 seedlings/m², and 29 days at 480 seedlings/m²; the variant with 1333 seedlings planted at the rate of nitrogen mineral fertilizers N₁₂₀ was 29 days, 30 days at 750 seedlings/m², and 30 days at 480 seedlings/m²; however, this process was observed to be relatively longer in the Gulistan variety. For example, it was observed that the nitrogen fertilizer rate N₆₀ was

29 days when rice seedlings were planted at 1333, 750, 480 grains/m², one day longer than the variety under study; the nitrogen fertilizer rate N₉₀ was 30 days when rice seedlings were planted at 1333, 750, 480 grains/m², one or two days longer than the variety under study; and the nitrogen fertilizer rate N₁₂₀ was 32 days when rice seedlings were planted at 1333, 750, 480 grains/m².

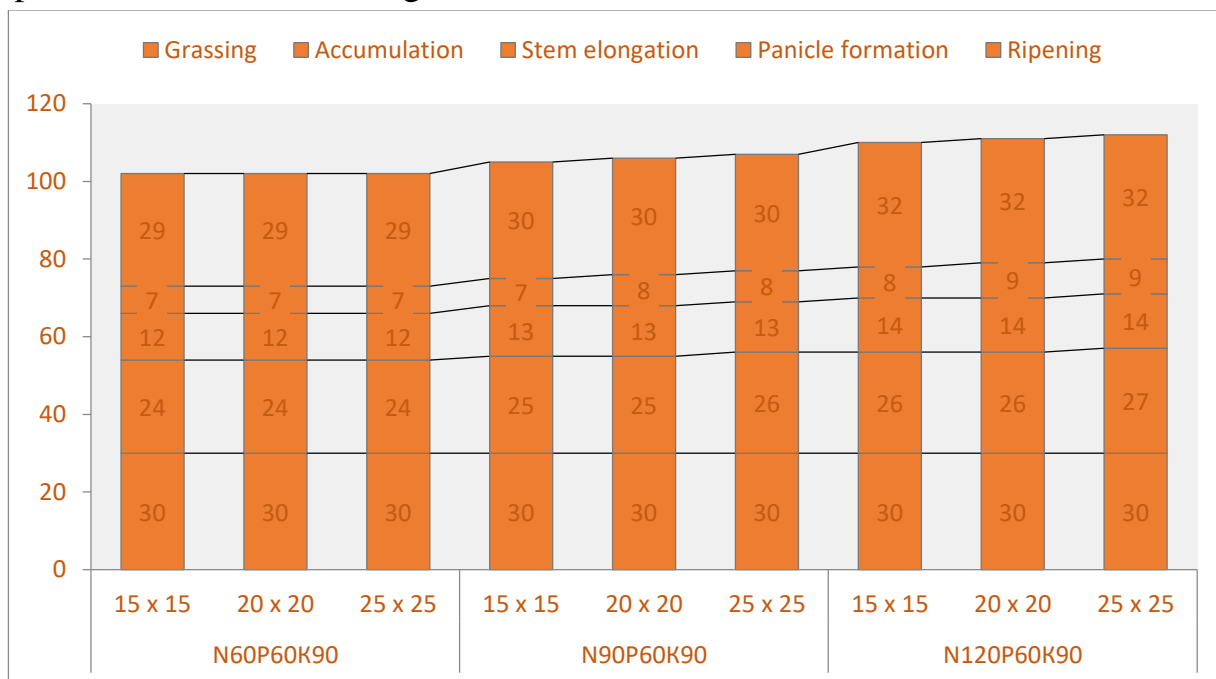


Figure 1.1. Effects of different sowing schemes and nitrogen fertilizer rates on the duration of the vegetation period of the Billur cultivar, days

In the table above, we can see that the Gulistan variety was observed to differ from the studied variety by 1-2 days in each phase.

It is known that if the required amount of rice seedlings is less than the required amount of nutrients, the plant will go through the growth period faster due to the inability of the plant to receive sufficient nutrients, which negatively affects the growth and development of the plant and the full development of the elements of the crop. If the nitrogen fertilizer rate is exceeded, the plant will not be able to absorb it, as a result, the number of accumulations will be large, but the effect on productivity will decrease and the growth period will be extended. This will affect the delay in harvesting.

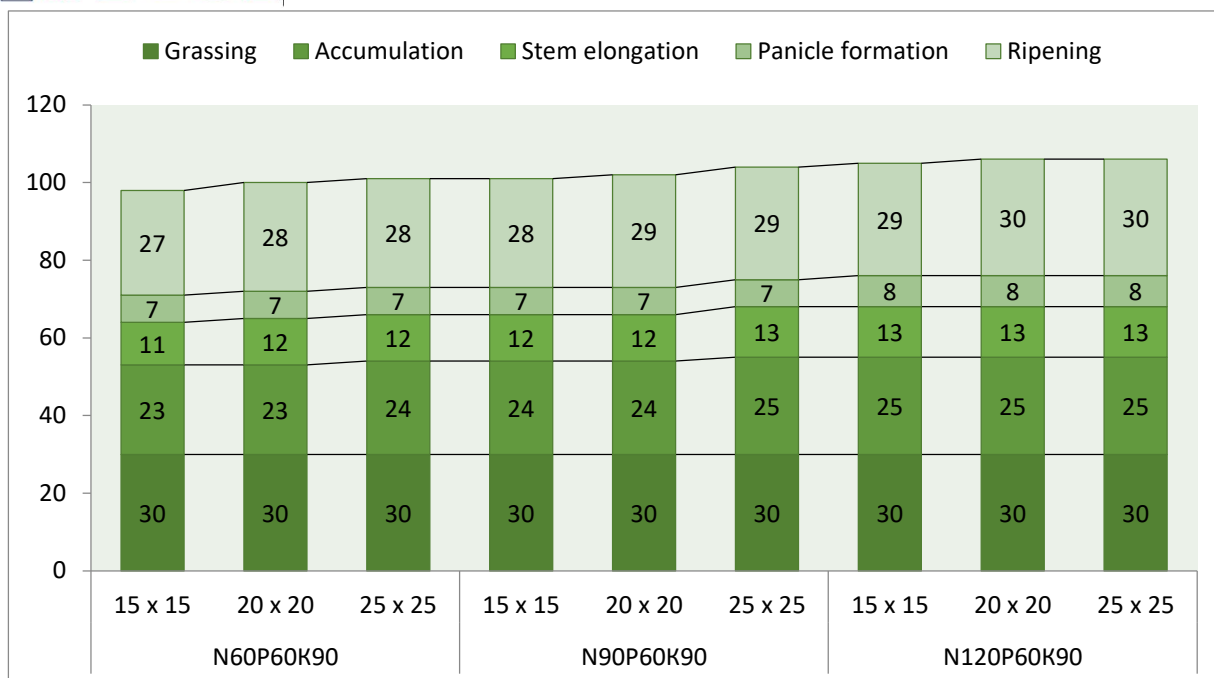


Figure 1.2. The effect of different sowing schemes and nitrogen fertilizer rates on the duration of the vegetation period of Gulistan cultivar, days

In the seedling cultivation of rice, the optimal planting and application of mineral fertilizers accelerates the growth and development of the plant and the ripening of the crop. In the variant with a feeding rate of $N_{90}P_{60}K_{90}$ kg/ha and a planting scheme of 20×20 cm, the ripening was observed 2-3 days earlier in the Billur variety, while in the Gulistan variety, the ripening was observed 3-4 days later in the 20×20 cm planting scheme with a feeding rate of $N_{90}P_{60}K_{90}$ kg/ha. In the variants with a feeding rate of $N_{120}P_{60}K_{90}$ kg/ha, the vegetation period was prolonged.

Conclusion. An increase in the rate of nitrogen fertilizers (from N_{60} to N_{120}) leads to a lengthening of the growing season in both varieties. In particular, when using the rate of N_{120} , the accumulation and ripening phases are significantly extended, which leads to a delay in the harvest period. The expansion of the planting scheme (from 15×15 cm to 25×25 cm) changes the plant's nutrition area and affects the development phases. For example, it was observed that the accumulation and ripening processes occur 1-2 days later in the 25×25 cm scheme than in densely planted variants. In the study, the rate of $N_{90}P_{60}K_{90}$ and the 20×20 cm planting scheme were found to be the most optimal option for the Billur variety. Under these conditions, the plant goes through development phases normally and ripens 3-4 days earlier compared to the Gulistan variety, which allows to save time and productivity.

References

1. Resolution of the President of the Republic of Uzbekistan No. RP-4973 “On measures for the further development of rice cultivation” dated February 2, 2021
2. Hameed K. A., Jameel S. J., Ali M. A. Application of the system of rice intensification (SRI) to rice seedling transplanting: Effects on plant density and growth // International Journal of Agricultural Research. — 2013. — Vol. 8, № 2. — P. 77–85.
3. Kakar K., Xuan N. S., Nozoe T. D. et al. Effect of plant density and seedling age on growth and yield of rice (*Oryza sativa* L.) // Journal of Agronomy and Crop Science. — 2023. — Vol. 209, № 2. — P. 185–196.
4. Urazmetov K.K. Development of alternative terms for planting rice as a main and secondary crop by the seedling method // Journal of Agricultural Sciences No. 7.2014. P.23-24