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THE EFFECT OF ULTRAVILEGE LIGHT ON THE GERMINATION RATE, STEM AND ROOT LENGTH OF LAZURNIY RICE SEEDS

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Abstract
The effect of ultraviolet rays (power, time and distance) on the seed quality indicators (germination rate, stem and root length resulting from seed nutrition stimulation and agglutination) of the Lazurniy variety of rice was determined. When the power of ultraviolet rays and the length of light were 30+30 W, the irradiation time was continued for 11 seconds, and the distance of irradiation to the seeds was applied at a height of 30 cm, the germination rate of the seeds was 98%, and the stem length was 9 cm and the root length was 7.5 cm as a result of seed nutrition stimulation and agglutination with rays. , compared to those not exposed to ultraviolet rays, the germination rate of seeds was 10.4%, the length of the stem was 4.7 cm, the length of the root It is stated that it is 3.5 cm higher.

Keywords: Rice, Lazurnii, variety, seed quality indicators, germination rate, seed nutrient stimulation, germination, stem, root length, ultraviolet light, power, time, distance.

Introduction

In the context of global climate change, the development of desertification and salinization in the republic, and the tendency to decrease water resources, the importance of rice seed production in rice farming, as well as in other areas of plant science, is increasing. It should be noted that currently, rice breeding work is carried out mainly on its complex characteristics.

It is known that the selection process for creating varieties requires a long period of time. However, it is necessary to urgently introduce high-quality seeds of rice varieties into production.

It is known from scientific achievements and the experience of leading producers that modern, properly organized seed production increases crop yields by 25-30 percent. Crop yields depend on the correct selection of varieties, the quality of the seeds used for planting, and the level of agrotechnology used.

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In the Republic of Uzbekistan, in 2025, 160.7 thousand hectares of rice were sown and 867 thousand tons of rice products were produced. Today, in order to fully satisfy the needs of the population of the republic in rice, 1 million tons of rice should be grown per year. There are all natural opportunities to increase rice cultivation, and to achieve this, it is necessary to expand the areas under rice cultivation, most importantly, increase productivity and widely introduce scientific achievements and effectively use advanced technologies. It is urgent to stabilize the population's demand for rice by creating rice varieties suitable for the soil and climatic conditions of the regions, establishing seed production, and using modern agricultural technologies.

Given the limited land and water resources in the republic, further increasing the efficiency of seed production in rice cultivation, fully utilizing the biological properties of promising rice varieties created in the republic, improving the quality of seeds under the influence of ultraviolet rays, and widely implementing new effective agrotechnologies developed in the field of science, in particular seed science, are urgent issues of the day.

Literature Review

Light comes in different forms: light, heat, X-rays, and ultraviolet. The longest of these are radio waves, and the shortest are gamma rays. Between the longest and shortest wavelengths are the light rays that are visible to us. Light rays themselves consist of waves of different lengths. Each color has a certain wavelength. Red is the longest wavelength visible to the eye. Then come orange, yellow, green, blue, and violet. The shortest of these is violet light.

After violet light comes the even shorter ultraviolet light range. Ultraviolet light is emitted by the sun and special lamps made for this purpose.

Since ultraviolet rays are short, they have the property of passing through any obstacle. Only half of the ultraviolet rays coming from the sun reach the earth. Most of them are absorbed and do not pass through the atmosphere, which is located at a considerable height above the ground.

Research Methods

When conducting field experiments on the propagation of new varieties of rice seeds, the organization of primary and primary seed nurseries, the “Methodical manual for the cultivation of high-generation rice seeds” by B.G. Kadyrov, R.Sh. Telyaev and the placement of self-pollinating plants according to the scheme “Methodical experimental work on selection, seed breeding, seed study and control of rice seed quality” (Krasnodar) of the All-Russian Rice Research Institute were used. In addition, the “Standard Rice Evaluation System” of the International Rice Research Institute (IRRI) was used to study the biometric indicators of rice. Calculations, phenological and other observations in laboratory and field experiments were carried out on the basis of the “Methodological Manual of the State Commission for Testing Agricultural Crop Varieties”.

The purpose of the study

To determine the effect of ultraviolet rays (power, time and distance) on the seed quality indicators of rice (germination rate, stem and root length formed as a result of seed nutrition stimulation, agglutination).

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Object and subject of the study

Scientific Research Institute of Rice Growing, Laboratory of Seed Production and Seed Science, seeds of the late-ripening rice variety "Lazurniy", seed quality indicators (germination rate, stem and root length in a wet state formed as a result of seed nutrition stimulation, agglutination), the effect of ultraviolet rays (power, time and distance).

Analysis and results

The effect of ultraviolet rays on the quality indicators (germination rate, stem and root length) of seeds of the late-ripening rice variety "Lazurniy" was studied in laboratory conditions in 2026.

In the control variant, in which the seeds of the Lazurniy variety of rice were not exposed to any ultraviolet (electric) rays. The germination rate of the seeds was 87.6%, the stem length was 4.3 cm, and the root length was 4 cm.

In the first variant, where the UV equipment, i.e. the ultraviolet light emitting lamps, had a power of 30 W, a wavelength of 253.7 and 300 nm, an irradiation time of 11 seconds, and the distance of light emitting to the seeds, i.e. the distance from the irradiating lamps to the seeds, was 10 cm high, the germination rate of the seeds was 97%, and the stem length was 8 cm and the root length was 7 cm. In return for stimulating and accelerating the nutrition of the seeds with rays, the germination rate of the seeds was 94%, the stem length was 3.7 cm, and the root length was 3 cm. higher than in the control variant. As above, the power of the ultraviolet light-emitting lamps was 30+30 W, and the seeds were exposed for another 11 seconds, and the distance from the irradiating lamps to the seeds, that is, the light-emitting distance, was increased to 20 cm. In the second variant, the germination rate was 96%, the stem length was 7 cm, and the root length was 6 cm., and it was observed that the germination rate was 8.4%, the stem length was 2.7 cm, and the root length was 2 cm higher than the control. In the third variant, the light-emitting distance was increased to 30 cm., the germination rate of rice seeds was 98%, the stem length was 9 cm, and the root length was 6.5 cm. Compared to the control variant, the germination rate of seeds was 10.4%, and due to the stimulation and acceleration of seed nutrition with light, the stem length was 4.7 cm, and the root length was 3.5 cm higher. Now, when the irradiation time was increased to 22 seconds, the fourth variant, where the irradiation distance was again used at a height of 10 cm, had a germination rate of 8.4%, stem length of 0.4 cm, and root length of 2 cm higher than the control. At the same power, in the fifth variant, where the irradiation distance was increased to a height of 20 cm, germination was 97%, stem length of 8 cm, root length of 6 cm, and germination was 94%, stem length of 3.7 cm, and root length of 2 cm longer than the control. At the same power, in the sixth variant, where the irradiation distance was increased to a height of 30 cm, germination was 94%, stem length of 4.7 cm, and root length of 2.5 cm longer than the control. When the irradiation time was increased to 33 seconds and the irradiation distance was increased to 10 cm, in variant 7, the germination rate was 2.4%, the stem length was 0.4 cm, and the root length was 1 cm higher than the control. In variant 8, the irradiation distance was increased to 20 cm, the germination rate was 8.4%, the stem length was 3.4 cm, and the root length was 3 cm higher than the control. In variant 9, the irradiation distance was increased to 30 cm, the germination rate was 2.4%, the stem length was 2.7 cm, and the root length was 2 cm higher than the control.

Feedback When the power of the lamps that emit ultraviolet light to rice seeds was increased to 60 W with wavelengths of 253.7 and 300 nm, and the irradiation time was another 11 seconds, it

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was found that in variant 10, where the distance of irradiation to the seeds, that is, the distance from the irradiating lamps to the seeds, was 10 cm high, the germination rate was 7.4%, the stem length was 3.7 cm, the root length was 2 cm higher than the control, in variant 11, where the irradiation distance was increased to 20 cm high, the germination rate was 9.4%, the stem length was 3.7 cm, the root length was 3 cm higher than the control, and in variant 12, where the irradiation distance was increased to 30 cm high, the germination rate was 8.4%, the stem length was 2.7 cm, and the root length was 2 cm higher than the control. When the irradiation power was left at 60+60 W and the irradiation time was increased to 22 seconds, the germination rate was 94%, the stem length was 3.2 cm, and the root length was 2 cm higher in variant 13, which was used at a height of 10 cm. The germination rate was 3.4%, the stem length was 1.7 cm, and the root length was 1 cm higher in variant 14, which was used at a height of 20 cm. The germination rate was 8.4%, the stem length was 3.2 cm, and the root length was 2 cm higher in variant 15, which was used at a height of 30 cm. The germination rate was 7.4%, the stem length was 2.7 cm, and the root length was 1 cm higher in variant 16, which was used at a height of 10 cm. In variant 17, where the irradiation distance was 20 cm, the germination rate was 8.4% higher than the control, the stem length was 2.7 cm, and the root length was 2 cm higher. In variant 18, where the irradiation distance was 30 cm, the germination rate was 9.4% higher than the control, the stem length was 3.7 cm, and the root length was 3 cm higher. In the Lazurny variety, the power of the ultraviolet lamps was increased to 90 W, the irradiation time was 11 seconds, and in variant 19, where the irradiation distance was 10 cm, the germination rate was 8.4% higher than the control, the stem length was 2.7 cm, and the root length was 2.5 cm higher. In variant 20, where the irradiation distance was 20 cm, the germination rate was 10.4%, the stem length was 3.7 cm, and the root length was 2.5 cm higher than the control. In variant 21, where the irradiation distance was 30 cm, the germination rate was 84%, the stem length was 2.7 cm, and the root length was 2 cm higher than the control. The irradiation power was left at 90+90 W, the irradiation time was increased to 22 seconds, and the irradiation distance was again 10 cm higher than the control. In variant 22, where the irradiation distance was 10 cm, the germination rate was 0.4%, the stem length was 1.7 cm, and the root length was equal to the control. In variant 23, with a light source at a height of 20 cm, the germination rate was 4.4%, the stem length was 2.7 cm, and the root length was 2 cm higher than the control. In variant 24, with a light source at a height of 30 cm, the germination rate was 84%, the stem length was 3.2 cm, and the root length was 2.5 cm higher than the control.

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The effect of ultraviolet radiation on the germination rate, stem and root length of Lazurniy rice variety seeds in laboratory conditions 2026

№	Power,W P253.7+P300 sec,	Power, W P253.7+ P300 sec,	Power,W P253.7+P300 sec,	Power,W P253.7+P30 0 sec,	Power,W P253.7+P300 sec,	Power,W P253.7+P300 sec,
Ln_1				85	4	3
Ln_2	Control	-	-	90	5	4
Ln_3				88	4	5
L_1	30+30	11	10	97	8	7
L_2	30+30	11	20	96	7	6
L_3	30+30	11	30	98	9	7,5
L_4	30+30	22	10	96	7.5	6
L_5	30+30	22	20	97	8	6
L_6	30+30	22	30	97	8	6,5
L_7	30+30	33	10	90	6	5
L_8	30+30	33	20	96	7	7
L_9	30+30	33	30	90	6	5
L_{10}	60+60	11	10	95	7	5
L_{11}	60+60	11	20	97	8	7
L_{12}	60+60	11	30	96	7	6
L_{13}	60+60	22	10	96	7.5	6
L_{14}	60+60	22	20	91	6	5
L_{15}	60+60	22	30	96	7.5	6
L_{16}	60+60	33	10	95	7	5
L_{17}	60+60	33	20	96	7	6
L_{18}	60+60	33	30	97	8	7
L_{19}	90+90	11	10	96	7	6,5
L_{20}	90+90	11	20	98	8	6,5
L_{21}	90+90	11	30	95	7	6
L_{22}	90+90	22	10	88	6	4
L_{23}	90+90	22	20	92	7	6
L_{24}	90+90	22	30	95	8,5	6,5
L_{25}	90+90	33	10	91	6	5
L_{26}	90+90	33	20	90	7	6
L_{27}	90+90	33	30	96	7	6

When the ultraviolet light exposure time was increased to 33 seconds, it was found that in variant 25, where the irradiation distance was 10 cm, the seed germination rate was 3.4%, the stem length was 1.7 cm, and the root length was 1 cm higher than the control. In variant 26, where the irradiation distance was 20 cm, the germination rate was 2.4%, the stem length was 2.7 cm, and the root length was 2 cm higher than the control. In variant 27, where the irradiation distance was 30 cm, the germination rate was 84%, the stem length was 2.7 cm, and the root length was 2 cm higher than the control.

Conclusion

In our studies conducted to determine the effect of ultraviolet rays (power, time and distance) on the seed quality indicators (germination rate, stem and root length resulting from seed nutrition

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stimulation and agglutination) of the Lazurniy variety of rice, the highest indicator was obtained when the ultraviolet rays power was 30+30 W, the irradiation time was 11 seconds, and the distance of light irradiation to the seeds was 30 cm. In the third variant, the seed germination rate was 98%, and the stem length was 9 cm and the root length was 7.5 cm due to the stimulation and agglutination of the seeds with rays. Compared to the control variant, where nothing was used, that is, the seed germination rate was 10.4%, and due to the stimulation and acceleration of seed nutrition with rays, the stem length was 4.7 cm higher and the root length was 3.5 cm higher.

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