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Article

Effect of Biopreparations and Fertilizer Rates on the Fertility Of Iskandar Variety in Field Conditions

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Abstract: Feeding the rice variety «Iskandar» with mineral fertilizers at different doses and applying the biopreparations «Yer Malhami», «Bist», and «Zamin M» has a positive effect on seedling density. The optimal seedling density is achieved when mineral fertilizers are applied at recommended rates and «Zamin M» is used at a rate of 10 L/t before sowing the seeds. This approach is scientifically justified.

Keywords: Feeding the «Iskandar» rice variety, biopreparations «Yer Malhami», «Bist», «Zamin M»

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1. Introduction

The concept of seed germination is ambiguously defined in the literature. Seed germination is defined as the set of physical and biochemical changes that occur in seeds during their transition from dormancy to an active state, leading to the formation of a seedling that can grow and develop into a new plant. [1].

The germination process is very complex and is interconnected with decomposition, synthesis, oxidation and reduction reactions in plant tissues. For biochemical reactions to occur, general and specific metabolic reactions, enzymatic systems are required. The time of increasing the activity of individual enzymes varies greatly from one another. There is a need to monitor the dynamics of morphological and physiological processes of germination indicators [2]. These traditional organic methods can contribute to the development of current organic farming technologies. However, several agricultural organic materials used in traditional farming have not been sufficiently studied for their growth-promoting effects [3] Increased root growth further facilitates the absorption of nutrients from the rhizosphere, thereby allowing plants to accumulate increasing doses of water and soluble nutrients, and as a result, improve plant growth [4] Recent advances in understanding how microorganisms positively affect plant growth, production, and health, with a particular focus on rice. Various microbial species and taxa live in the rhizosphere and phyllosphere of plants and play multiple roles as symbiotic endophytes, inhabiting plant tissues and even cells. [5]

2. Research Methods

Field experiments, laboratory analyses and phenological observations were conducted based on the manual "Methods of conducting field experiments". "Methodical instructions for testing insecticides, acaricides, biologically active substances and fungicides" were used and the net productivity of photosynthesis was determined according to the method of N.N. Tretyakov, and the results obtained were statistically analyzed using the Microsoft Excel program according to the method of B.A. Dospekhov [6].

3. The Results Obtained

It was found that in the conditions of the meadow swamp soils of the Tashkent region, when planting the "Iskandar" rice variety at the rate of 6 million seeds per hectare and feeding it with 10 l / t of biopreparation at the rate of $N_{100}P_{70}K_{140}$ kg / ha , it is possible to save 25-30% on the amount of nitrogen fertilizers used per unit area while achieving high yields [7]. As a result of the use of biopreparations and optimal rates of nitrogen fertilizers in rice cultivation, grain yield increased by 15-20% and quality indicators improved;

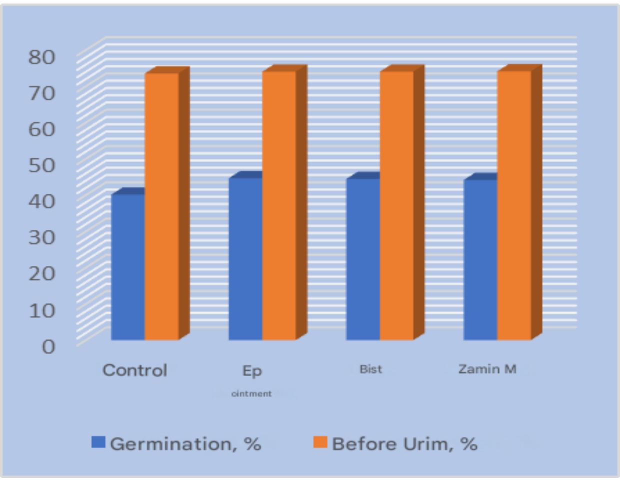
According to the results of the study, the germination of seeds is determined by the ability of the blades to break through sand or soil with a certain force and the blade of green blades[8]. Field germination is in any case lower than laboratory germination, which primarily depends on the quality of the seed, agrotechnical conditions, environmental factors, as well as damage to seeds and plants by diseases and insects[9].

Enhancement of rice germination and seedling growth also depends on direct seeding. Better performance in unfavorable soil and atmospheric conditions can be achieved by improving seed germination performance by pre-sowing seed treatment[10].

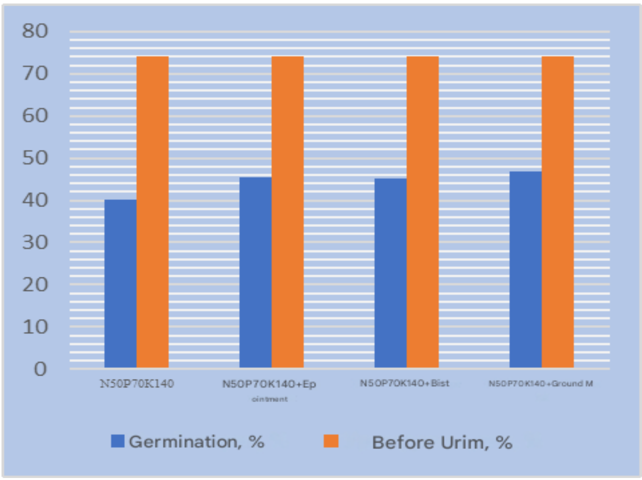
The conducted studies examined the effect of biological preparations and fertilizer rates on the yield of the Iskandar variety of rice (Table 5, Appendix). According to three-year data, the yield of the Iskandar variety of rice in field conditions ranged from 240.6 m^2/seed to 311.33 m^2/seed.

In the control (without fertilizer and biopreparation) option, the rice seeds germinated in field conditions were on average 240.6m^2/unit, while in the experiments where Er malham, Bist and Zamin M biopreparations were used, this indicator was 267.78, 266.44 and 264.89 m^2/unit, respectively[11].

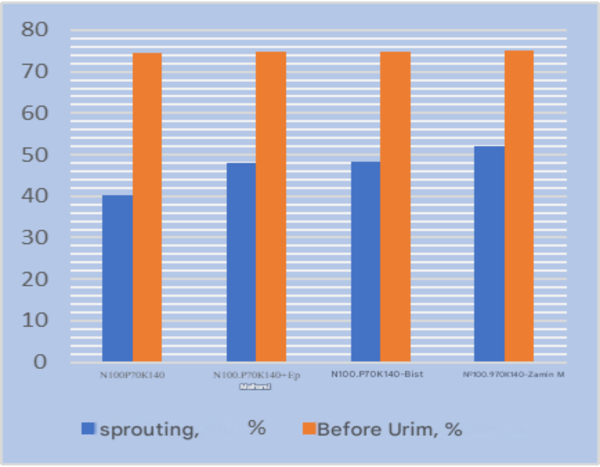
In the experiment using biopreparations, the highest indicator was determined in the variant using the Zamin M biopreparation. In the experiment using the fertilizer rate $H_{50}P_{70}K_{140}$ as the background , the number of seeds germinated in field conditions was 241.8 m^2/seed, in the variants using the fertilizer rate $H_{50}P_{70}K_{140}$ and the variants using the Er Malkham, Bist, Zamin M biopreparations, this indicator was 273.1, 271.1, 282.0 m^2/seed. In the experiment using the $N_{100}P_{70}K_{140}$ as the background, the number of seeds germinated in field conditions was 241.23. It gave a difference of 0.63 m^2/seed compared to the control variant (240.6 m^2/seed) . This indicator did not give a significant difference[12].



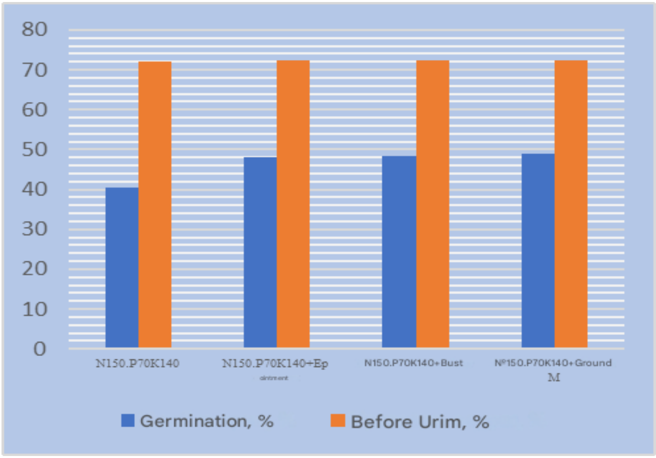
Picture-1 . Effect of biopreparations on the germination and storage of rice "Iskandar" variety



Ras -2. Effect of biopreparations and fertilizer $N_{50}R_{70}K_{140}$ norms on the germination and storage of rice "Iskandar" variety



Picture-3. Effect of biopreparations and fertilizer N $_{100}$ R $_{70}$ K $_{140}$ norms on the germination and storage of rice "Iskandar" variety.



Ras -4. Effect of biopreparations and fertilizer N $_{150}$ R $_{70}$ K $_{140}$ standards on the germination and storage of rice "Iskandar" variety

The number of germinated seeds was 242.2 m ^{2}/piece in the experiment where fertilizer rate N $_{150}$ P $_{70}$ K $_{140}$ was used [13]. Compared to the control option, this indicator was 1.6 m ^{2}/piece. In this experiment, it was found that when the biopreparation was used, there was a significant difference in seed germination. It was found that the number of seeds germinated in field conditions was 288.11, 298.8, and 293.4 m ^{2}/seed in Erhammi, Bist and Zamin M variants, respectively [14]. It was found that biopreparations used in field conditions affected. It was observed that this indicator was higher than the control option by 27.18 to 52.8 m ^{2}/piece.[15]

4. Conlusion

It turned out that feeding the Iskandar variety of rice with mineral fertilizers at different rates and using Yer Malhami, Bist and Zamin M biopreparations had a positive effect on its seedling density, and the most optimal seedling density was 311.0 thousand seedlings per hectare when mineral fertilizers N $_{100}$ R $_{70}$ K were applied at a rate of $_{140}$ kg/ha and treated with Zamin M at a rate of 10 l/t before sowing .

REFERENCES

[1] Kh. Egamov and I. Kimsanov, *Qishloq xo'jalik ekinlari urug'chiligi va urug'shunosligi*. Tashkent: Fan, 2020.

[2] N. V. Obrucheva, "Physiology of early stages of seed germination in dicotyledonous plants," Dr. Sci. dissertation, Moscow, Russia, 1991.

[3] P. V. Tikhonchuk and E. A. Semenova, "Enzymatic activity of some enzymes in Glycine max and Glycine soja," *Vestnik RASKhN*, no. 3, pp. 33–35, 2006.

[4] S. Zhang and Y. Cook, "Effects of plant extracts on growth stimulation of leafy vegetables," *Horticultural Science and Technology*, vol. 37, pp. 322–336, 2019.

[5] N. Candan and L. Tarhan, "Relationship among chlorophyll-carotenoid content, antioxidant enzyme activity and lipid peroxidation in Mentha pulegium leaves under Mg2+ deficiency," *Plant Physiology and Biochemistry*, vol. 41, no. 1, pp. 35–40, 2003.

[6] K. Yogeshwari and N. Harsha, "Management of biotic and abiotic stress using beneficial microorganisms," *Rhizosphere Biology Journal*, vol. 5, no. 2, pp. 45–60, 2020.

[7] M. A. Bewley, K. Bradford, H. Hilhorst, and H. Nonogaki, *Seeds: Physiology of Development, Germination and Dormancy*, 3rd ed. New York: Springer, 2013.

[8] J. D. Bewley, "Seed germination and dormancy," *The Plant Cell*, vol. 9, no. 7, pp. 1055–1066, 1997.

[9] H. Nonogaki, G. W. Bassel, and J. D. Bewley, "Germination—still a mystery," *Plant Science*, vol. 179, no. 6, pp. 574–581, 2010.

[10] A. Finch-Savage and G. Leubner-Metzger, "Seed dormancy and germination," *New Phytologist*, vol. 171, no. 3, pp. 501–523, 2006.

[11] R. L. Finch-Savage, "The role of temperature in seed germination," *Journal of Experimental Botany*, vol. 57, no. 2, pp. 303–314, 2006.

[12] D. L. Nelson and M. M. Cox, *Lehninger Principles of Biochemistry*, 7th ed. New York: W.H. Freeman, 2017.
[13] L. Taiz, E. Zeiger, I. Møller, and A. Murphy, *Plant Physiology and Development*, 6th ed. Sunderland: Sinauer Associates, 2015.
[14] P. J. Davies, *Plant Hormones: Physiology, Biochemistry and Molecular Biology*, Dordrecht: Springer, 2010.
[15] M. Ashraf and P. J. C. Harris, "Abiotic stresses: Plant resistance through breeding," *Plant Science*, vol. 166, no. 1, pp. 3–16, 2004.