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BIOLOGICAL EFFECTIVENESS OF FUNGICIDES AGAINST RICE BLAST IN THE REPUBLIC OF KARAKALPAKSTAN

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ANNOTATION

The article presents data on the study of the use of fungicides against rice blast in the Republic of Karakalpakstan. The fungicide Foliant BT, 22.5% c.e., showed the highest biological effectiveness against rice blast. (a.i. - Tebuconazole + triadimefon), which was 90.0-92.7%, and the yield was 68.7 t/ha. Then came the drug Amistar Top 32.5% s.c., taken as a standard, where the efficiency was 86.5-88.9%, with a yield of 64.2 t/ha, followed by the fungicide Merit 32.5% s.c. comparable with the standard. (a.i. - Azoxystrobin + Difenoconazole), where the biological efficiency was 85.8-87.1% with a yield of 66.5 t/ha.

KEY WORDS: *rice, blast, fungicide, biological effectiveness.*

INTRODUCTION

Cereal crops, in particular rice, is one of the most important agricultural crops in Uzbekistan. Rice is one of the oldest food crops and ranks second in the world in terms of cultivated area after wheat and is the main food source for half of the world's population. Rice is grown in 108 countries of the world, the total area is 145 million hectares. According to FAO, the population in general in Europe consumes 5-6 kg of product per year and up to 200 kg in Southeast Asia.

In modern environmental conditions, a decrease in productivity and a deterioration in the quality of agricultural products cause various diseases caused by fungi, bacteria, and viruses. In this connection, at present, an urgent task is to develop and introduce into production measures to combat diseases, in particular, blast, as one of the main diseases of rice.

Blast is the most damaging disease of rice, causing great damage every year in all areas where rice is cultivated. There are leaf, nodular and paniculate forms of the disease.

The causative agent of the disease is Piricularia oryzae Br. et Cav. From the order Hyphomycetales of the class Deuteromycetes.

The disease is common wherever the crop is grown and manifests itself throughout the growing season of plants. All aboveground organs are affected. Depending on the nature of the damage, three forms of diseases are distinguished: leaf, nodular and paniculate.

Leaf form. Light brown spots up to 3-4 cm long with a dark brown, almost black border are formed on the leaves and their sheaths, covered with a dirty gray coating of conidial sporulation. They gradually increase, acquire a brown color and dry out. With severe damage, plants can die, more often they do not form a panicle, they look like burnt ones.

Nodal form. Black-brown spots appear on the nodes and stems, the nodes turn black, soften, become covered with a dirty gray coating of conidial sporulation, constrictions form, the stems break. In plants affected by this form, the grain in the panicle, as a rule, is not formed.

Panicled form. The main and lateral axes of the panicle are affected, which darken, soften and rot. The lower part of the glumes darkens, grains either do not form at all or are feeble, light in color with low germination.

The fungus forms an intercellular mycelium, from which conidial sporulation emerges through the stomata of the leaves.

During the growing season, the pathogen is spread by conidia. They germinate at humidity above 98% and at temperatures in the region of 7-40^0 C. Mass germination of conidia and intense damage to plants occurs in the presence of drop-liquid moisture on plants and a temperature of 22-24^0 C. Under such conditions, the disease can acquire an epiphytotic character.

The main source of infection is uncultivated and not flooded affected plant residues and seeds, on which the causative agent of the disease persists in the form of a mycelium.

Losses of potential rice yield from blast in ordinary years are up to 25%, and in years of epiphytoties - up to 60% or even more.

The harmfulness of the disease is manifested in:

- Decrease in seed germination;
- Death of seedlings;
- Loss of individual plants during the growing season;

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- The formation of a smaller amount of grain in spikelets;
- The formation of underdeveloped or feeble seeds.

The mycelium of the blast fungus is preserved in the seed, so the most important measure in the treatment of this disease is pre-sowing seed preparation.

To suppress the vital activity of the fungus in the seeds, they are treated with a systemic fungicide. This contributes to healthy seedlings and prevents the mass death of rice sprouts during germination. In the future, when symptoms of the disease are detected during the growing season, the fields are treated with fungicides in order to prevent the mass spread of the disease.

With the development of the disease during the growing season of rice, a very effective chemical method of protection is used.

PLACE AND METHODS OF RESEARCH

Production test of the preparation Merit 32.5% s.c. and Foliant BT, 22.5% c.e. was held in the farm named "Karamat" Nukus district of the Republic of Karakalpakstan. The rice planting took place on June 5th.

The first treatment of plants with fungicides was carried out on June 25, when the first signs of the disease appeared on the field.

Testing of the preparation, carrying out accounting and processing of digital material was carried out according to the "Guidelines..." of the State Chemical Commission of the Republic of Uzbekistan (Khodzhaev, 2004). To determine the damage of plants, we used the scale recommended for accounting for the development of diseases according to A.E.Chumakov, I.I.Minkevich, T.I.Zakharova (Chumakov et al., 1974).

Scale for determining the degree of damage to seedlings:

Score: 0 - no damage;
1 - up to 1/5 of the area of crops;
2 - up to 1/3 of the area;
3 - up to 2/3 of the area;
4 - more than 2/3 of the area;

The percentage of disease development was determined by the following formula:

$$R = 100^* \sum (AB_1+AB_2+AB_3+AB_4)/N^*K$$

where, R - the intensity of the development of the disease,
A is the number of plants; B_1; B_2; B_3; B_4 - scores from 1 to 4.
∑(AB) - the sum of the products of the number of plants and the corresponding score
N is the total number of registered plants (sick and healthy)
K - the highest score on the scale for recording the intensity of the damage

The biological effectiveness of the fungicide Merit 32.5% s.c. and Foliant BT, 22.5% c.e. against blast was determined by the following formula:

$$C = \frac{Pk - Po}{Pk} \cdot 100$$

where: C – biological efficiency, %; Pк is an indicator of the development of the disease in control; Po is an indicator of the development of the disease in the experimental plot (in the experiment), in terms of 15, 30 or 45 days, scores.

RESULTS OF THE RESEARCH

In 2022, studies were conducted to determine the effectiveness of the use of chemicals against blast.

The studies were carried out from the first treatment (June 15), the second treatment (June 29) and the third treatment (July 13) from the period when the first signs of the disease appeared in the plant.

We studied the biological effectiveness of the use of preparations Merit 32.5% s.c. at a rate of 1.0 l/ha, Foliant BT, 22.5% c.e. (0.6 l/ha) For comparison, the fungicide Amistar Top 32.5% s.c. at a consumption rate of 0.6 l/ha. The data obtained are presented in table 1.

In the control variant (the preparation was not sprayed), the damage of rice by paricullariosis was 33.4%, and the development of the disease was 43.3%.

When making the fungicide Merit 32.5% s.c. rice damage by paricullariosis ranged from 5.2 to 8.5%, and the development of the disease from 1.5 to 2.8%. Biological efficiency ranged from 84.2 to 87.1%, and the yield was 66.5 c/ha.

When using the fungicide Foliant BT, 22.5% c.e. the damage was from 3.3% to 3.8%, the development of diseases from 1.0% to 1.3%. Biological efficiency ranged from 90% to 92.3%, and yield - from 1.0 ha to 66.5 t/ha.

As a standard used, Amistar Top 32.5% s.c. the incidence ranged from 4.7 to 9.0%, the development of diseases from 1.3 to 2.4%. Biological productivity ranged from 86.5 to 88.9%, the yield was 64.2 c/ha.

Dignity 32.5% s.c. 1.0 l/ha and Foliant BT, 22.5% c.e. The biological effectiveness of the tested fungicides at a rate of 0.6 l/ha increased from 84.2 to 92.3%, the development of the disease increased from 1.0 to 2.8%.

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Table 1.

Biological efficacy of the studied preparations against rice blast

(Karakalpakstan, Nukus district, Rice Research Institute, 1.5 ha, variety Nukus-2, 2022)

№	Variants	Consumption rate, kg/ha	15.06.2022.			29.06.2022.			13.07.2022.			Yield, t/ha
			Damage, %	Disease development, %	Biological efficiency, %	Damage, %	Disease development, %	Biological efficiency, %	Damage, %	Disease development, %	Biological efficiency, %	
1.	Control - no processing (spraying with water)	-	33,4	11,7	-	36,7	12,7	-	43,3	17,8	-	54,2
2.	Amistar Top 32.5% s.c. (standard)	0,6	4,7	1,3	88,9	7,4	1,6	87,4	9,0	2,4	86,5	64,2
Fungicides were applied 3 times												
3.	Merit 32.5% s.c. (Azoxystrobin + Difenoconazole)	1,0	5,2	1,5	87,1	5,0	1,8	85,8	8,5	2,8	84,2	66,5
Fungicides were applied 2 times												
4.	Foliant BT, 22.5% c.e. (Tebuconazole + triadimefon)	0,6	3,3	1,0	92,3	3,8	1,3	90,0	-	-	-	68,7

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CONCLUSIONS

The fungicide Foliant BT, 22.5% c.e. showed the highest biological effectiveness against rice blast. (a.i. - Tebuconazole + triadimefon), which was 90.0-92.7%, and the yield was 68.7 t/ha. Then came the preparation Amistar Top 32.5% s.c., taken as a standard, where the efficiency was 86.5-88.9%, with a yield of 64.2 t/ha, followed by the fungicide Merit 32.5% s.c. comparable with the standard (a.i. - Azoxystrobin + Difenoconazole), where the biological efficiency was 85.8-87.1% with a yield of 66.5 t/ha.

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