

# The Significance of the Study of Species Composition of Disease-Causing Fungi in Rice

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## Abstract

*The article outlines the results of the study of infestation degree of rice with main fungal diseases, such as blast, fusarium and alternaria. The data presented in the obtained results show that during the growing season rice is affected by fusarium disease up to 20%, by blast disease up to 19%, by alternaria disease up to 14%. In the research, pure cultures of disease-causing fungi of Fusarium, Alternaria, Pyricularia genera were isolated and their species composition was morphologically determined using a microscope.*

**Keywords:** Rice, Root, Leaf, Stem, Grain, Fusarium, Alternaria, Pyricularia, Variety, Iskandar, Devzira, Alanga.

## Introduction

It is known that rice grain (rice) has been cultivated in many countries of the world since ancient times and it is one of the valuable products common and widely consumed worldwide. Among its hundreds of useful properties, it is the easiest to digest in the human body compared to other nutrients, its composition (contains proteins that are not found in other cereal crops) and its richness in vitamins and organophosphorus compounds. In our country, rice is still grown on irrigated lands, and climate changes have almost no effect on its productivity. It has been proven in practice that even in drought conditions, it is possible to obtain a higher yield of rice if the required agricultural technologies are applied on time.

There are several methods of rice cultivation in the world experience. In our republic, this crop is mostly grown on the basis of the technology of soaking the seeds in water. In this case, it is required to maintain the water level in the rice field at a density of 5-7, 10-12, 15-20 centimeters until the harvest is ripe (G. Rakhimov., 2021). In the conditions of the republic, more than 10 varieties of rice are planted and the average yield is 35-40 tons/ha. In the cultivation of rice from seeds and seedlings and to obtain a higher and better quality harvest, it is recommended to apply effective seed-treatments against fungal diseases before sowing the seeds. Rice is affected by several diseases from the germination period to the end of the growing season. Rice is mainly affected by blast, fusarium wilt, alternaria, ascochyta and septoria diseases and they significantly damage the yield.

*F.oxysporum, F.culmorum, F.avenaceum, F.heterosporum* species of fungi infect 10-30% of the plant in causing root rot disease in seedlings in the rice fields of our republic. Spikes of infected plants produce less grain. The quality of rice grain deteriorates and its quantity decreases sharply. It is observed that the leaves of the diseased plant become dry, the nodes are shortened, and the stem is gradually twisted. Observations made during the years 1986-90 show that saprophytic species of fungi infecting rice plants together with pathogenic species cause the appearance of disease symptoms [1].

## The object and the methods of research

In the experiments, samples of rice were used which were grown at the experimental station of the Scientific Research Institute of Rice, located in the Kuyi Chirchik district of the Tashkent region. In this case, samples were taken from plants showing symptoms of disease and washed and cleaned of external infection for analysis in the laboratory. Infected parts of washed plants (root, leaf, stem, grain) were cut into small pieces and planted in Petri dishes on potato agar artificial nutrient medium [2,3,4]. Petri dishes planted with infected rice parts were grown in a thermostat at 27°C for 3 days. Pure cultures were isolated from each of the fungi isolated from plant fragments. Pure cultures were placed in a thermostat at 27 °C for another 3 days. Then, the pure cultures of the isolated fungi in test tubes were prepared on a glass slide, and their conidia were observed under a microscope, and the types of conidia were determined based on the shape of the conidia [5,6].

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## Research results

The research was conducted to study the degree of infestation of Devzira, Iskandar, Alanga rice varieties grown in the conditions of Tashkent region and foreign

varieties adapted to our condition with fungal diseases and their invasion degree. In the research, it was found that during the growing season, rice is mainly infected with blast, fusarium, alternaria diseases.

**Table-1** Infestation degree in rice by disease-causing fungi, % (2022)

| № | Experimented rice varieties | Disease-causing fungi species and infestation degree in rice |          |             |               |
|---|-----------------------------|--------------------------------------------------------------|----------|-------------|---------------|
|   |                             | Number of studied plants                                     | Blast, % | Fusarium, % | Alternaria, % |
| 1 | Iskandar                    | 100                                                          | 15       | 20          | 12            |
| 2 | Sadaf                       | 100                                                          | 17       | 23          | 15            |
| 3 | Laser                       | 100                                                          | 14       | 19          | 13            |
| 4 | Mustakillik                 | 100                                                          | 12       | 14          | 9             |

In the information presented in the table, we can see the infection degree of rice with fungal diseases in the rice fields in Tashkent region. In the experiment, a total of 100 samples were taken from the plants showing symptoms of disease in varieties Iskandar, Devzira, Alanga Koreysky. When the obtained samples were analyzed in laboratory conditions, the fungi which cause blast, fusarium, alternaria diseases were isolated. The species composition of isolated fungi were morphologically identified under a microscope (Fig. 1). A total of 100 plant samples were analyzed, and it was found that 15% of Iskandar varieties were affected by blast disease, 20% by fusarium disease, and 12% by alternaria disease. While the Devzira variety of was affected by blast 17%, 23% by fusarium disease, and 15% by alternaria disease. It was noted that 14% of Alanga variety was affected by blast disease, 19% by fusarium disease, and 13% by alternaria disease. It was found that 12% of the Koreysky variety was infected with the blast disease, 14% with the fusarium disease, and 9% with the alternaria disease.

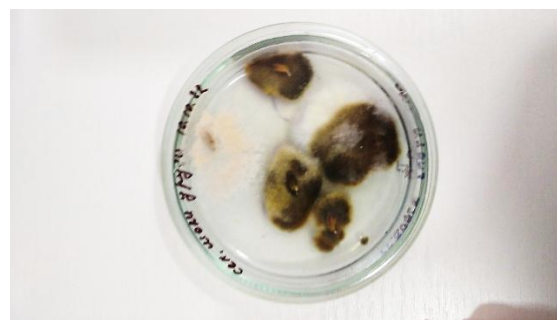
## Pathogens isolated from plants infected with fungal diseases during the growing season of rice



**Figure 1.** Pre-harvest sampling of infected plants in rice fields



**Figure 2.** Pre-harvest sampling of infected plants by varieties in rice fields



**Figure 3.** Fungi of the genus *Pyricularia*, *Fusarium*, isolated from infected parts of rice plant



**Figure 4.** Colonies of fungi of *Pyricularia*, *Alternaria* genera isolated from infected parts of rice plant

The disease-causing fungi shown in the figures are the main pathogens that cause severe damage to rice during the growing season.

### Conclusion

To conclude it was found that diseases of rice are mainly caused by fungi belonging to the genus *Fusarium*, *Alternaria*, and *Pyricularia*. Systematic study of species composition, biology of these fungi makes it possible to develop disease control measures.

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