

Mini Review

Management of Fungal Diseases of Temperate Rice in the Kashmir Valley, India

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Abstract

Over half of the world's population is fed by rice. It is consumed as a staple food by many countries worldwide. It is affected by a number of diseases among which fungal diseases contribute to its significant loss. Kashmir Valley located in the North Western Himalayan region of India is known for various coarse varieties of rice for their taste and elite class. However, the diseases cause a serious problem for the local farmers as well as the people who also consume rice as their staple food. One of the best remedies for disease management is the adoption of integrated disease management strategies, which include the use of resistant varieties, cultural practices, and judicious use of fungicides. In this review, we present the major fungal diseases affecting rice in Kashmir Valley and their management using Integrated Plant Disease Management (IDM).

Introduction

Rice (*Oryza sativa* L.) is a vital staple crop worldwide, including in the Kashmir Valley, where it plays a crucial role in food security and livelihoods. However, rice production in this region is threatened by various diseases that can significantly reduce yields and quality. The management of major rice diseases under the temperate conditions of the Kashmir Valley is a critical aspect of ensuring the sustainability and productivity of rice cultivation. By understanding the challenges posed by diseases such as blast disease, sheath blight, and brown spot, and by implementing integrated disease management strategies, farmers can effectively protect their rice crops and contribute to the region's agricultural prosperity [1-4]. Continued research, knowledge-sharing, and collaboration among stakeholders will be essential in refining and adapting these strategies to address the evolving disease dynamics and support the long-term viability of rice cultivation in the Kashmir Valley [5-7]. This article aims to provide an overview of the major rice diseases encountered in the temperate conditions of the Kashmir Valley and discuss effective management strategies. The information presented here is based on scientific studies and research conducted in the field.

More Information

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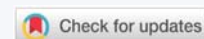
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1. Blast disease (*Magnaporthe oryzae*)

Blast disease is a significant threat to rice production globally, including in the temperate regions of the Kashmir Valley. It is caused by the fungal pathogen *Magnaporthe oryzae*. To effectively manage blast disease, several integrated approaches are recommended [7-10]. These include planting resistant varieties, cultural practices such as crop rotation, seed treatment with fungicides, and timely application of foliar sprays [5,11,12]. For instance, varieties like SR4 and K-39 have shown resistance to blast disease in the Kashmir Valley [7,13]. Furthermore, seed treatment with fungicides can contribute to blast disease management. Treating rice seeds with appropriate fungicides before sowing helps protect emerging seedlings from infection. Fungicides like carbendazim and tricyclazole have been found effective against blast disease and can be used for seed treatment [4,14,15].

2. Sheath blight (*Rhizoctonia solani*)

Sheath blight, caused by the fungus *Rhizoctonia solani*, is a destructive disease that poses a significant threat to rice production in the temperate conditions of the Kashmir Valley. It is characterized by the necrotic lesions that appear on the leaf sheaths, resulting in the wilting and lodging of rice plants.



To manage sheath blight, the adoption of cultural practices is crucial. These include maintaining proper spacing between plants and avoiding excessive nitrogen fertilization. Biological control measures using antagonistic biocontrol agents also prove to be an effective strategy against the disease [5,16]. Chemical control measures can be employed as part of an integrated approach to managing sheath blight. Fungicides are an effective tool for controlling the disease when cultural practices alone are insufficient. Fungicides such as carbendazim and propiconazole have shown efficacy against *Rhizoctonia solani* and can be applied as foliar sprays during the early stages of sheath blight development. It is important to follow recommended application rates and timings, as well as adhere to safety precautions when using fungicides [5,17].

3. Brown spot (*Bipolaris oryzae*)

Brown spot, caused by the fungus *Bipolaris oryzae*, is a prevalent disease in the Kashmir Valley. It manifests as small, oval spindle-shaped lesions on the leaves, leaf sheaths, and panicles of the rice plant [6,18]. To manage brown spots effectively, a combination of cultural and chemical control measures is recommended. Cultural practices include proper field sanitation, avoiding dense planting, and timely irrigation to prevent water stress. Fungicides like azoxystrobin and tricyclazole have shown efficacy in controlling brown spots and can be applied as foliar sprays during the early stages of disease development. It is important to follow the recommended application rates, timings, and safety precautions when using fungicides [17,19,20].

Conclusion

Rice diseases pose a significant challenge to rice production in the temperate conditions of the Kashmir Valley. However, through the adoption of integrated disease management strategies, including the use of resistant varieties, cultural practices, and judicious use of fungicides and bactericides, these diseases can be effectively managed. It is essential for farmers and researchers to collaborate closely, sharing knowledge and experiences, to develop region-specific management practices tailored to the unique agroecological conditions of the Kashmir Valley. By implementing these strategies, farmers can mitigate the impact of major rice diseases and enhance rice production, contributing to food security and sustainable agriculture in the region.

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