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Review of fungal diseases in crop plants and their management in district Jaunpur (U.P.)

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Abstract

Crop productivity is greatly impacted by fungus diseases, which result in lower yields and financial losses. Crops including wheat, rice, sugarcane, and legumes are widely grown in the Jaunpur district, where agriculture is the main source of income. Nonetheless, a variety of fungal pathogens thrive in the area due to its climate, which includes high humidity and temperature fluctuations. Common diseases that negatively impact crop health include rust, blight, powdery mildew, and smut. An overview of the fungal infections that are common in Jaunpur, their causative organisms, and their impacts on agricultural productivity are given in this review. Additionally, it examines contemporary management techniques such as the application of fungicides, integrated disease management (IDM) plans, cultural practices, and resistant crop varieties. To reduce fungal illnesses, the assessment emphasizes the necessity of using environmentally friendly and sustainable methods, such as biological control agents and organic amendments. The report also highlights the significance of farmer education and training initiatives in putting into practice efficient disease control strategies, guaranteeing regional food security and agricultural sustainability.

Key words : Crop, Fungus, disease, resistant.

A major barrier to agricultural output is fungus-related diseases, especially in areas like Jaunpur, Uttar Pradesh, where the environment and farming practices encourage the growth of fungal pathogens. The incidence of fungal infections in important crops, their effect on yields, and the management measures used are highlighted in a thorough assessment of the literature currently in publication.

Jaunpur crops have been reported to be susceptible to a number of fungal infections. According to Chatrath *et al*.,[1], rust infections produced by Puccinia species, especially leaf rust (Puccinia triticina), which flourishes in the district's humid environment, severely harm wheat, one of the region's primary crops. Blast (*Magnaporthe oryzae*) and sheath blight (*Rhizoctonia solani*) are two problems that affect rice, another important crop. The former

is more common during the monsoon season[5]. According to Viswanathan and Samiyappan[10], waterlogging frequently makes red rot (*Colletotrichum falcatum*), which is extremely dangerous for sugarcane, the district's cash crop, worse.

Fungal infections have a major negative impact on crop quality and output. Research conducted in Uttar Pradesh has shown that rust illnesses can cause up to 30% of wheat crop losses[4]. Similarly, yield decreases from rice blast can range from 10% to 50%, contingent on the severity of the illness and management strategies[5]. In addition to lowering yield, sugarcane red rot also lowers sucrose content, which costs farmers money[10].

Chemical Control: In Jaunpur, fungicides including propiconazole, mancozeb, and carbendazim are frequently used to treat fungal illnesses[6]. Chemical fungicides are effective, but their misuse has caused environmental problems and the establishment of disease strains that are resistant to them[3].

Resistant varieties: There has been a focus on the creation and uptake of disease-resistant cultivars. The region's disease incidence has been significantly reduced by blast-resistant rice varieties like Pusa Basmati 1509 and rust-resistant wheat types like HD 2967 [4].

Cultural Practices: To lower the danger of fungal disease outbreaks, crop rotation, timely sowing, and balanced nutrient management are advised[2].

Integrated techniques that include biological, chemical, and cultural treatments have shown promise in the sustainable management of fungal diseases. In order to combat soil-borne infections such as Fusarium and *Rhizoctonia*, bio-control agents such as *Trichoderma harzianum* and Pseudomonas fluorescens have proven to be effective[7]. It has also been discovered that organic amendments like compost and farmyard manure improve soil health and inhibit fungus-related diseases (Sharma *et al*., 2017). Digital instruments for early disease identification and precision agricultural methods for more efficient fungicide application are examples of recent developments in disease control[9]. Adoption of sophisticated management approaches is still hampered by issues such low farmer awareness, poor extension services, and the expensive price of disease-resistant seeds[6].

Fungal diseases affect the world's food security by posing serious risks to crop quality and productivity. Common diseases that infect horticulture plants, wheat, rice, maize, and other crops include *Alternaria, Rhizoctonia, Aspergillus*, and *Fusarium*. Understanding the epidemiology, host-pathogen interactions, and climate factors that worsen epidemics is essential for effective management of these illnesses.Wheat in Jaunpur is susceptible to Fusarium head blight and Puccinia species, which cause rust and lower grain quality and production.The local crop of rice is greatly impacted by *Magnaporthe oryzae* (blast disease) and *Rhizoctonia solani*-caused sheath blight."

Multidisciplinary ways to managing fungal diseases sustainably are highlighted in studies like Epidemiology and Control of

Fungal Diseases in Crop Plants. To improve management tactics, these research combine biological controls, disease modeling, and molecular biology tools.

The promise of nanomaterials for environmentally friendly fungal disease prevention is described in recent agronanotechnology reviews.

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