Managing Evolving Dynamics of Fungal Diseases in Rice to Strengthen Food Security in Sri Lanka

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Abstract

Rice has been cultivated in Sri Lanka for over 2,000 years, with traditional farming methods deeply rooted in the nation's agricultural heritage. Despite its historical significance, rice production in Sri Lanka faces significant challenges from pests and diseases that significantly affect the production. This chapter explores the evolving landscape of fungal diseases impacting rice cultivation in Sri Lanka and their implications for food security. Over time, these diseases have exhibited complex and shifting patterns, complicating management efforts. Identifying symptoms has become increasingly difficult as they often deviate from previously documented patterns, and new, unidentified diseases continue to emerge, requiring extended research to determine their causal agents. The chapter provides a comprehensive analysis of the historical evolution of these diseases and their impact on rice production. It also provides an overview of traditional and modern breeding techniques, including Marker-Assisted Selection and genetic engineering, highlighting their potential applications and limitations in developing resistant rice cultivars. It also examines the vital roles of government policies, research institutions, and international collaborations in supporting fungal disease management. Additionally, the chapter addresses challenges such as limited genetic diversity and financial constraints in cultivar development and adoption. Concluding with insights into future trends and technological advancements in disease management, the chapter underscores the importance of a collaborative approach to enhance resilience in rice production and strengthen food security in Sri Lanka.

Keywords: disease identification, disease resistance, food security, fungal diseases, rice cultivation,

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