

Research Article

Deciphering the Biometeorological Influences on Mycoflora Dynamics in Rice Seeds of Indo-Gangetic Ecosystem

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Abstract

Rice (*Oryza sativa* L.) is a vital global food source, particularly in Asia, where it constitutes 60 to 70 per cent of cereal production. However, rice cultivation faces many challenges including seed-borne fungal pathogens. This study aimed to comprehensively assess the incidence and severity of seed-borne fungal pathogens in various rice varieties and their relationship with environmental parameters during different growth stages. Seed samples were collected from different locations in Nadia district, West Bengal, and analyzed for seed health. The prevalence of *Helminthosporium oryzae*, *Alternaria alternata*, *Fusarium* sp., *Curvularia lunata*, *Penicillium* sp., *Aspergillus flavus*, *Aspergillus niger* and *Trichoconis padwickii* was recorded. Compared to the other diseases, *Fusarium* sp. shows a distribution with greater kurtosis deviation from normalcy, suggesting the occurrence of more extreme values. In contrast, the tailedness of *Aspergillus niger*'s distribution is more akin to that of a normal distribution. Eight varieties of rice were examined for their susceptibility to various seed-borne fungal pathogens, revealing that variety Shatabdi exhibited a high vulnerability to these pathogens. The isolation of seed-borne pathogens was carried out at different growth stages of rice, and it was observed that the harvesting stage is particularly susceptible to seed-borne pathogens. Temperature and humidity influence pathogen intensity differently across years, indicating the complex interplay of environmental factors in disease dynamics. This research contributes to understanding the temporal and spatial dynamics of seed-borne fungal pathogens in rice, facilitating the development of targeted management strategies for improved crop health and yield.

Key words: Biometeorological parameters, growth stages, rice, seed borne, varieties

Citation: Umbrey Y, Ravat VK, Devi MI, Mahapatra S and Das S. 2024. Deciphering the biometeorological influences on mycoflora dynamics in rice seeds of indo-gangetic ecosystem. *J Mycol Pl Pathol* 54 (1): 25-34 (<https://doi.org/10.59467/JMPP.2024.54.25>)