

Role of Modern Tools and Information Technology *vis-à-vis* Artificial Intelligence in Rice Pest and Disease Management : An Overview

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ABSTRACT

Agriculture sector faces lot of challenges in order to maximize its yield and quality produce. All these challenges include improper soil treatment, disease and pest infestation, big data requirements, low output, and knowledge gap between farmers and technology. Among these pest and disease problems are also the major problems. Present trends of crop management are application of modern molecular tools and incorporations of IT and AI which are interlinked and dependent each other. This article presents an overview of the applications of modern tools in pest and disease management.

Key words : Rice, Pest, Disease, Genome editing, Hyperspectral, Nanotechnology, IoTs

Introduction :

Plant, pathogen and insects, are natural creatures and all should co-exist in the earth but certain insects and pathogens occur in the entire growth period of the crop that causes a huge reduction in crop production. This reduction is not only due to yield losses but also includes significant losses in the quality of the produce. Rice is one such crop and is one of the most important pillars of food security in India. To meet the future demand of food, earning substantial amount of foreign currency through export, and also to sustain present self-sufficiency, rice productivity has to increase from present 2.56 to 3.25 t ha⁻¹ by 2050. Globally crop plants losses 20%

to 40% yield per year due to pests and diseases (Savary *et al.*, 2019). On an average 37% loss of rice yield is due to pest problems (Sparks *et al.*, 2012). As per FAO estimates each year 40% of crop yields are reduced globally due to damages caused by plant pest and diseases. Besides quantitative loss qualitative loss is also cause of concern now-a-days, like false smut of rice significantly reduces germination ability, filled grain number, seedling vigor index (Bag *et al.*, 2016) and affects the grain quality such as amylase, total protein, antioxidant, total phenol content and other important cooking qualities (Bag *et al.*, 2017; Bag *et al.*, 2021). As per the information available from All India Coordinated research Project on Rice

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