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Current insights on rice (*Oryza sativa* L.) bakanae disease and exploration of its management strategies

Keywords: Rice, Bakanae disease, *Fusarium fujikuroi*, Host-pathogen interaction, Pathogenicity, GA signaling, Disease management

Summary

- This review mainly designed to provide a detailed up to date information about the nature of bakanae pathogen *Fusarium fujikuroi*, its pathogenicity and disease cycle.
- Further, we have largely discussed the strength and weakness of excysting management practices which includes physical, chemical and biological approaches for sustainable rice production.
- Current advantages in genetic engineering (genome editing modern breeding techniques) and its importance in bakanae disease management also discussed with appropriate references.

Key aspects of the paper

➤ **Pathogen screening:**

We have categorized the pathogens into four different classes based on the disease induction rate, this could be an easy screening method to detect virulent/non-virulent pathogens.

➤ **GA biosynthesis cycle:**

This paper exclusively elucidated the role of GA in bakanae disease induction through schematic representation.

➤ **Disease management strategies:**

So far, only a limited number of studies compiled the impact of different management strategies for bakanae disease control. In this review, we extensively compiled both traditional and modern management practices along with their respective positive and negative sides.

➤ **Modern breeding approaches:**

Further, this review paper discussed the importance of advanced biotechnological tools in sustainable food production.

Key aspects of the paper

- To summarize the most recent understanding of bakanae disease and its management practices, a series of detailed figures and tables were created.
- ✓ **Figures**
 1. Detailed history of bakanae disease research
 2. Pathogen morphology and symptoms of bakanae disease
 3. Pathogenicity scale of *F. fujikuroi*
 4. Bakanae disease cycle
 5. Schematic representation of the bakanae disease cycle
- ✓ **Tables**
 1. The *F. fujikuroi* strains of which the genomes have been sequenced
 2. Genotypic variation among rice cultivars in resistance to bakanae disease
 3. Management of bakanae disease with biological agents
 4. Bakanae disease resistant candidate QTL from previous reports

Overview of the review

