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Seed-borne Pathogenic Bacterium Interact with Air-borne Plant Pathogenic Fungus in Rice Fields

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Air-borne plant pathogenic fungus Fusarium graminearum and seed-borne plant pathogenic bacterium Burkholderia glumae are cause similar disease symptoms in rice heads. Here we showed that two pathogens frequently co-isolated in rice heads and F. graminearum is resistant to toxoflavin produced by B. glumae while other fungal genera are sensitive to the toxin. We have tried to clarify the resistant mechanism of F. graminearum against toxoflavin and the ecological reason of co-existence of the two pathogens in rice. We found that F. graminearum carries resistance to toxoflavin as accumulating lipid in fungal cells. Co-cultivation of two pathogens resulted in increased conidia and enhanced chemical attraction and attachment of the bacterial cells to the fungal conidia. Bacteria physically attached to fungal conidia, which protected bacterium cells from UV light and allowed disease dispersal. Chemotaxis analysis showed that bacterial cells moved toward the fungal exudation compared to a control. Even enhanced the production of phytotoxic trichothecene by the fungal under presence of toxoflavin and disease severity on rice heads was significantly increased by co-inoculation rather than single inoculation. This study suggested that the undisclosed potentiality of air-born infection of bacteria using the fungal spores for survival and dispersal.