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Mode of action of *Trichoderma asperellum* SKT-1, a biocontrol agent against *Gibberella fujikuroi*

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Abstract:
Trichoderma asperellum SKT-1 and *Gibberella fujikuroi*, known as causal agents of "Bakanae" disease, were both transformed with genes encoding green fluorescent protein (GFP) and hygromycin B (hygB) by restriction enzyme- mediated integration (REMI). Rice seeds inoculated with GFP-tagged *G. fujikuroi* showed "Bakanae" symptoms. GFP-tagged SKT-1 maintained biocontrol activity against the pathogen by soaking seeds in SKT-1 spore suspension. Then, we monitored *in situ* interactions between SKT-1 and *G. fujikuroi* on rice seeds using GFP-tagged transformations under confocal scanning laser stereomicroscopy. *G. fujikuroi* disappeared from the embryo of rice seeds after treatment with SKT-1, whereas SKT-1 was observed on the embryo 24 hr after initiation of germination. In addition, the hyphae of *G. fujikuroi* were penetrated by the hyphae of SKT-1, and degradation of the cell walls of *G. fujikuroi* was observed under SEM in co-culture. The cell wall of *G. fujikuroi* on the embryo of rice seeds was lysed, suggesting that mycoparasitism is the mode of action of *T. asperellum* SKT-1.

Keywords:
Trichoderma asperellum, biocontrol, transformed with GFP, *In planta* observation,

“Bakanae” disease

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