

Identification of dsRNA Mycoviruses in Plant-Pathogenic Fungus *Fusarium oxysporum*

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Fusarium oxysporum is a plant pathogenic fungus posing threat to many crops worldwide. Persistence in soil, inefficient chemical control and lack of treatment make this fungus a major cause for concern in agriculture. In this study, I focused on viruses infecting *Fusarium oxysporum*, exploring the possibility of using these so called mycoviruses to debilitate the fungus, thus protecting plants from disease. As a marker of fungal virus presence, I used dsRNA, which does not occur in cellular organisms, but is a constituent of most fungal viruses. Using dsRNA isolation as a marker of virus presence, I tested several *F. oxysporum* strains for viruses. Fungal strains positive and negative for dsRNA were then compared in terms of growth, microscopic morphology and pathogenicity toward *Arabidopsis thaliana*, a model plant. Viral dsRNA fragments were reverse transcribed, amplified, ligated into vector and cloned into *Escherichia coli* as preparation for further sequencing. From four fungal samples tested, one was conclusively dsRNA-positive, and thus marked as mycovirus-positive. No significant differences were observed in terms of growth or microscopic appearance. However, when inoculated in soil, only the fungus lacking dsRNA caused disease and subsequent wilt in plants. *Arabidopsis thaliana* inoculated with fungus containing dsRNA showed no signs of wilt or disease. In my work, I have demonstrated that mycoviruses may decrease virulence in plant pathogenic fungi. These results have shown great potential in employing a yet uncharacterized fungal virus to curb the spread of aggressive *Fusarium oxysporum*, currently threatening many vital crops such as banana plants worldwide.

Awards Won:

Second Award of \$2,000