Poster Presentation 4

P4-29

Potential contribution of a defective RNA segment of *Fusarium boothii* large flexivirus 1 on hypovirulence of the host Fusarium Head Blight fungus

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Purpose: Mycoviruses have a potential to be a biocontrol agent of pathogenic fungi. In the past 20 years, extensive mycovirus screenings identified diverse RNA and DNA mycoviruses, some of which were shown to affect host fungal growth and/or pathogenicity. This study was aimed at screening of virulence-attenuating mycoviruses that could control Fusarium Head Blight (FHB) disease of cereal crops.

Methods: Screening for virus-infected *Fusarium* species was conducted with conventional double-stranded RNA (dsRNA) detection. The sequence of dsRNAs was determined by construction of cDNA-library and subsequent sanger sequencing, and high-throughput RNAseq analysis. Biological properties of mycoviruses were analyzed by evaluation of growth and pathogenicity of host *Fusarium* fungi on a synthetic media and wheat plants. Virus curing was performed by single spore isolation and regeneration in the presence of an antiviral drug, ribavirin.

Results and conclusions: Growth-impaired, hypovirulent *Fusarium boothii* strain, BL13, was isolated and found to be virus-infected. A novel tymovirus-like virus namely Fusarium boothii large flexivirus 1 (FbLFV1) and a new mitochondrial virus, Fusarium boothii mitovirus 1 (FbMV1), each encoded single ORFs, were identified in BL13. The fungal strain additionally carried defective RNA form of FbLFV1 (D-RNA) that lacked most middle part of the FbLFV1 genome but retained the N- and C-terminal coding domains in-frame. The FbMV1 infection alone unlikely contributed to hypovirulence of the host fungus. Moreover, a possible contribution of the D-RNA to fungal growth inhibition was observed. Taken together, the D-RNA of FbLFV1 might produce a cytopathic protein that potentially control the FHB on wheat.