



Česká zemědělská univerzita v Praze

Fakulta agrobiologie,
potravinových a přírodních zdrojů

DOKTORSKÝ STUDIJNÍ PROGRAM

NÁVRH TÉMATU/PROPOSAL OF THEME

Studijní program/*Study Program*: **Special Agricultural Science/Agricultural and Forestry Phytopathology and Plant Protection**

Katedra/*Department of*: **Plant Protection**

Školitel (včetně titulů), email/*Supervisor*, email: prof. Ing. Pavel Ryšánek, CSc., rysanek@af.czu.cz

Konzultant (včetně titulů)/*Co-supervisor*: Ing. Jiban Kumar, Ph.D.

Forma studia/*Form of Study*: **Full_time**

Typ tématu/*Type of Theme*: **Framework**

Téma/Theme: RNAi based plant defense in wheat-virus-vector interactions

Hypotéza/Hypothesis: RNAi technology can be used in wheat protection against viruses

Anotace/Annotation: RNAi is a sequence-specific RNA degradation mechanism triggered by a double-stranded (ds) RNA. The dsRNAs are cleaved by Dicer proteins and processed by the RISC complex to produce small interfering RNAs (siRNAs) that target and destroy any homologous sequences in the cell. The introduction and expression of an inverted repeat sequence homologous to the targeted viral genome (RNAi technology) is an efficient approach for the induction of RNA silencing prior to conferring plant resistance to the virus. The main objective of the Ph.D. thesis is to study the host-virus-vector interactions in wheat to assess the efficacy of RNAi technology against the Wheat dwarf virus (WDV). WDV, belonging to the genus *Mastrevirus* of the Geminiviridae family, is a major viral pathogen of cereal crops including wheat, barley, maize, and others from the *Poaceae* family. WDV is transmitted by a leafhopper, *Psammotettix alienus*, in a circulative, nonpropagative manner by both the larval instars and the adult leafhoppers. The WDV infections cause up to 100 % yield losses of cereal crops worldwide. RNAi wheat lines developed by using the hairpin construct of the viral sequence will be challenged against WDV and its leafhopper vector to investigate the molecular characteristics of the wheat plant defence and resistance to the virus infection.

Zdroj financování/Source of: grants of Crop Research Institute

Datum/*Date*: 13.1.2020

Podpis/*Signature*: