

Biological Control: fighting below ground insect pests with *Pseudomonas* bacteria

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Introduction

- The cabbage root fly *Delia radicum* causes increasing losses in the production of Brassicacean crops and so far, no satisfactory control measures exist as most insecticides were banned due to negative environmental effects
- Plant-beneficial fluorescent *Pseudomonas chlororaphis* and *P. protegens* bacteria with entomopathogenic activity were screened for their potential as biocontrol agent against *D. radicum*
- Entomopathogenic nematodes (EPN) and fungi (EPF) are currently screened for their biocontrol potential against *D. radicum*, alone and in combination with entomopathogenic pseudomonads (EPP)

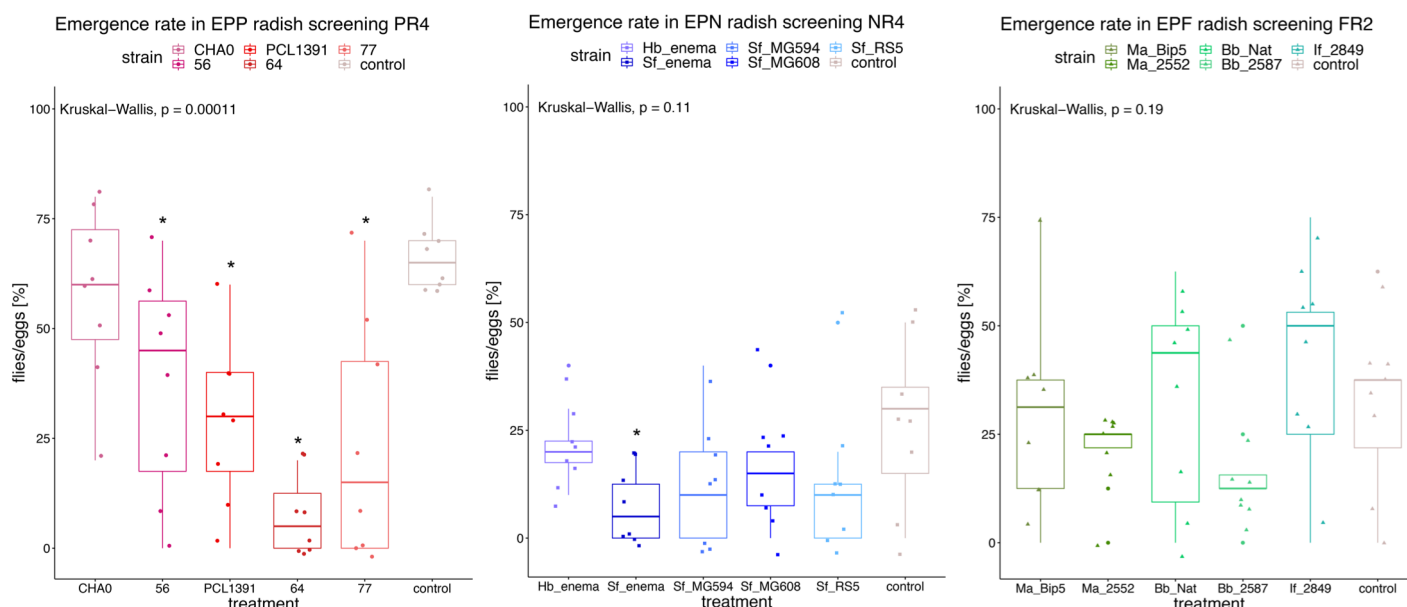
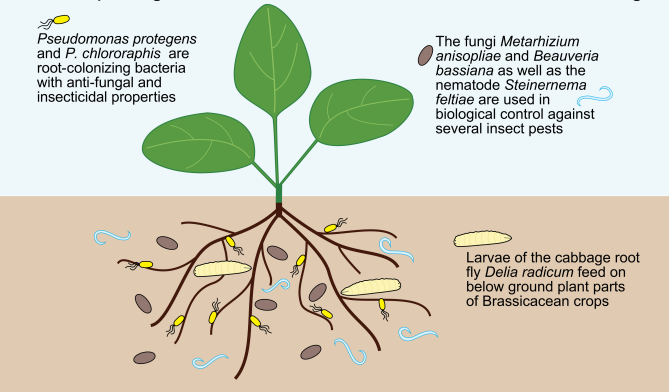
Conclusion and Outlook

- Promising EPP, EPF and EPN strains for biological control of *Delia radicum* were identified
- First combination experiments with EPP and EPN as well as EPP and EPF are on-going
- Further screenings, combination experiments, semi- and field trials will be conducted

Results

- Pseudomonas chlororaphis* strains PCL1391 and 64 significantly reduced *D. radicum* pupation and fly emergence under controlled conditions, with reductions up to 50-60% for strain 64
- EPN *Steinernema feltiae* isolate nemaplus (e-nema) significantly reduced *D. radicum* pupation and fly emergence up to 20-25%
- EPF *Metarhizium anisopliae* ART2552 and *Beauveria bassiana* ART2587 reduced pupation and fly emergence up to 10-15%

Biological control of the cabbage root fly *Delia radicum* combining entomopathogenic *Pseudomonas* bacteria, nematodes and fungi



Experiments done with **EPP** *Pseudomonas protegens* CHA0, 56, *Pseudomonas chlororaphis* PCL1391, 64, 77; **EPN** *Heterorhabditis bacteriophora* enema, *Steinernema feltiae* enema, MG594, MG608, RS5; **EPF** *Metarhizium anisopliae* Bipesco 5, ART2552, *Beauveria bassiana* Naturalis, ART2587, *Isaria fumosorosea* ART2849.

Experimental set-up

- 2 radishes per pot in sand
- 8 replicates per treatment
- EPP: radishes bathed in suspension (OD₆₀₀ = 0.473)
- EPF: suspension mixed into top sand (10⁶ spores / g)
- EPN: nematode suspension (4000 IJ / pot) added on sand
- Delia*: 10 eggs per pot added on top of sand
- Statistical analysis (R) of pupation rate, fly emergence rate, average pupae size