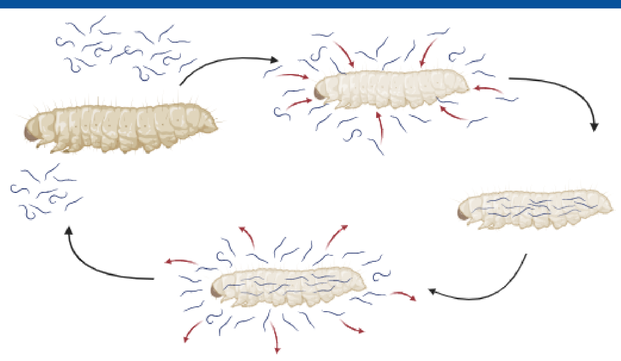
Efficacy of a Novel Entomopathogenic Nematode Isolate for Control of Canola Insect Pests

OLDS COLLEGE
OF AGRICULTURE & TECHNOLOGY

Introduction & Objectives

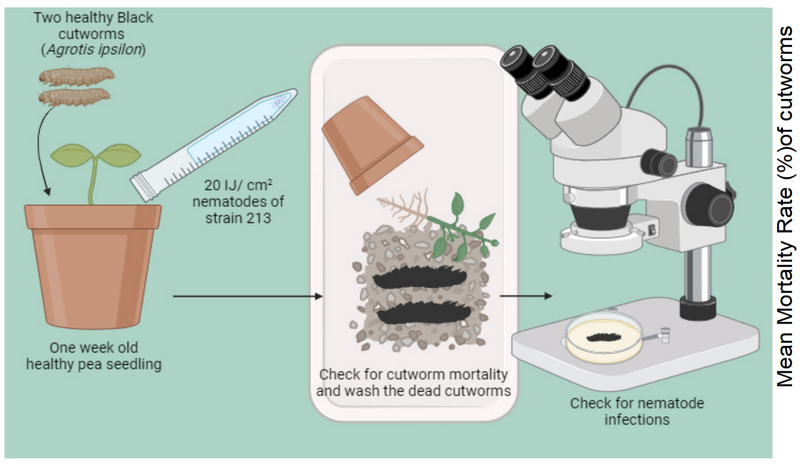
Commercially-available entomopathogenic nematodes (EPNs) – from the genus *Steinernema* – are an effective bio-control measure used to mitigate damage to canola crops caused by soil-dwelling insect pests. The efficacy of a newly identified and local strain of EPNs – strain 213 – is under investigation.

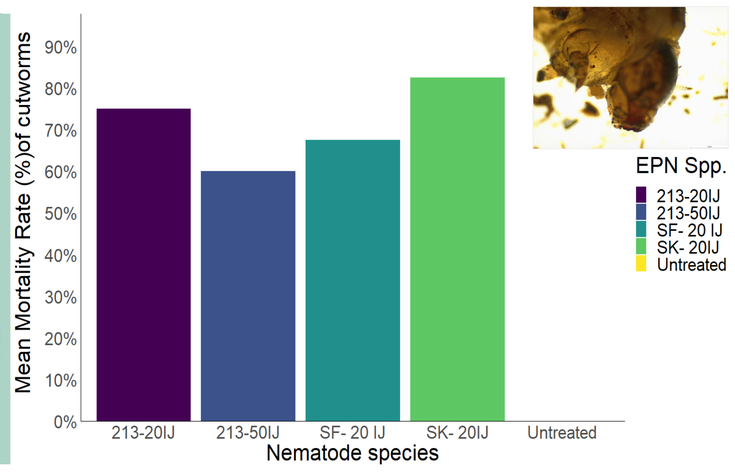
- Determine if local EPN strain 213 is capable of controlling two canola insect pests: black cutworms (*Agrotis ipsilon*) and cabbage root maggots (*Delia radicum*).
- Compare the effectiveness of local EPN strain 213 to two commercially-available EPN strains: *S. feltiae* (SF) and *S. kraussei* (SK).



The entomopathogenic nematode life cycle involves a series of stages, including infective juveniles seeking out and penetrating the pest insect, releasing bacteria that lead to septicemia, and ultimately causing the death of the pest through a combination of parasitism and bacterial infection

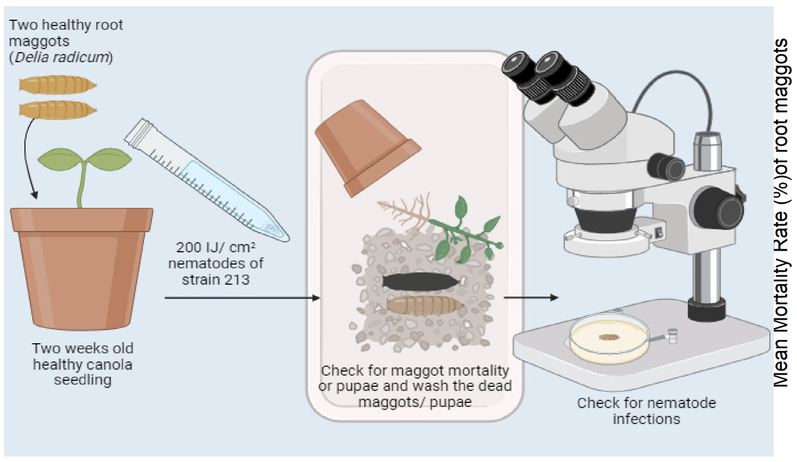
Method & Results

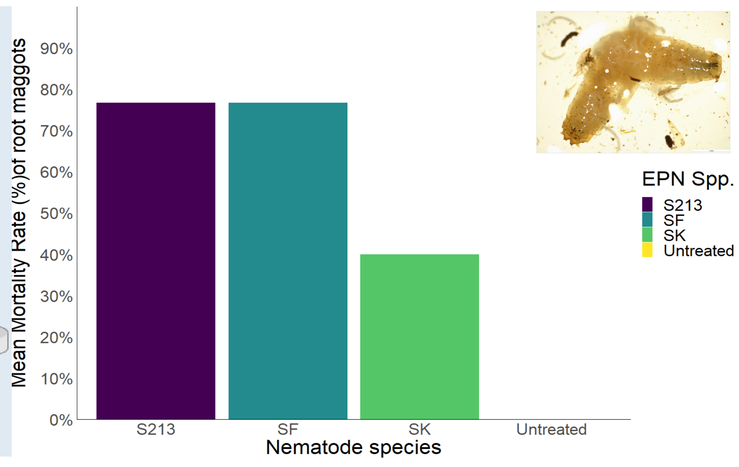




Mortality of black cutworms exposed to EPN strain 213:

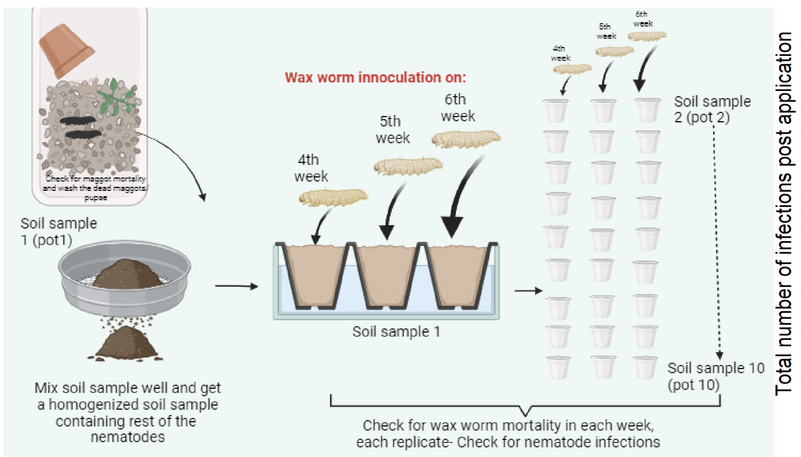
- The two commercial strain treatments (SF and SK) and the native strain treatment (S213) caused significant infection and mortality to cutworms compared to the control treatment.
- No mortalities under the control treatment.
- No significant differences ($p > 0.05$) between all four EPN treatments.

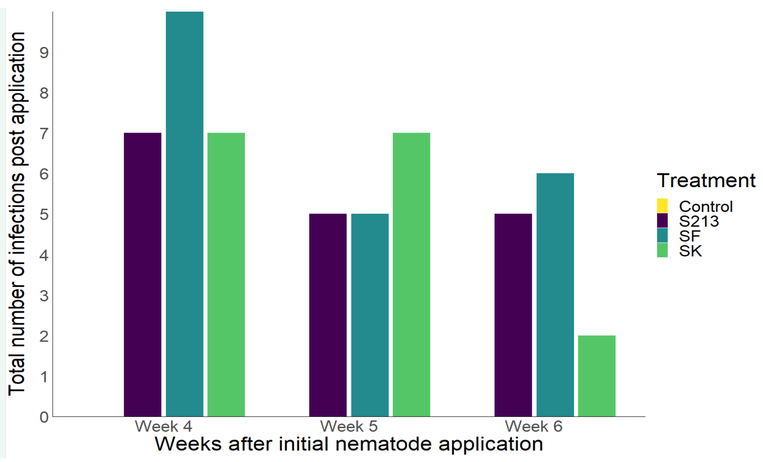




Mortality of cabbage root maggots exposed to EPN strain 213:

- Most maggots transformed into the pupae stage of development.
- All the nematode species caused significant mortality and infection to maggots in the different stages of development compared to the untreated controls ($p \leq 0.05$).
- The mortality of maggots in the SF treatment was comparable to S213 ($p > 0.05$), while the mortality under both treatments were significantly higher than SK ($p \leq 0.05$).





Persistence of EPN strain 213 in soil post-application:

- Mortality for different weeks revealed significant differences between week 6 and week 4 ($p \leq 0.05$) suggesting an impact of the varying time intervals on mortality.
- Significant differences in mortality between each treatment group and the control: S213-Control $p \leq 0.05$; SF-Control: $p \leq 0.05$; SK-Control: $p \leq 0.05$).
- No significant differences between mortality of treatment groups: SF vs S213 @ $p > 0.05$; SK vs S213 @ $p > 0.05$; SK vs SF @ $p > 0.05$).

Discussion & Conclusion

- No statistically significant divergence in mortality among the treatment groups (i.e., local strain and commercial strains) which suggests similar efficacy under controlled conditions, and possibility of mass production and applications of the locally adapted strain 213 in the future.
- Further exploration of biology – such as cold tolerance and potential effects on other beneficial organisms – is needed.
- Findings indicate the effect on viability of remaining nematodes in soil after initial nematode-application on mortality of emerging pests specific to certain intervals. This emphasized the importance of considering temporal factors in understanding the dynamics of entomopathogenic nematode efficacy against pests.

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Patuwatha Withanage, D.B.M., Briar, S. S. & Edeogu I.
dwithanage@oldscollege.ca