



Pratylenchus neglectus Common to the Canadian Prairies and a Parasite of Chickpea and Soybean

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Highlights

- A survey of commercial fields of the Canadian Prairies found, *Pratylenchus*, *Pratylenchus*, and *Quinisulcius* to occur in over 20% of fields with soil densities greater than 790/kg soil
- Paratylenchus* was mainly *P. projectus*, *Pratylenchus* was *P. neglectus* and *Quinisulcius* was *Q. capitatus* based on molecular identification
- Ditylenchus* found was *D. weischeri* associated with Canada Thistle, *D. dipsaci* was found in one yellow pea field in Manitoba
- In a pot study, *P. neglectus* reproduced best on soybean, canola and chickpea. It maintained on pinto bean and spring wheat and severely declined on lentil
- A microplot study confirmed *P. neglectus* to reproduce on soybean
- The results warrant host studies for *P. projectus* and *Q. capitatus*, and variety studies of *P. neglectus* to soybean and chickpea

Objectives

- Determine the abundance and distribution of plant-parasitic nematodes of field cropped soils in the Canadian Prairie Provinces (Alberta-AB, Saskatchewan-SK, Manitoba-MB)

Methods

- Field Crop Survey:** 20 benchmark locations sampled for soil, above-ground crop and flowers/pods, and Canada Thistle in 93 pulse (pea, chickpea, lentil) fields (Fig. 1)
- Host Study:** 7 major field crops grown in the Canadian Prairies examined to increase from a low starting density (180/kg soil) of the *Pratylenchus* and grown for three cycles (2 months each + 3 week rest between (Fig. 2). Crop varieties were the most common to the Prairies
- Microplot Study:** Soybean grown in cylinders (25 diam. x 20 cm deep). A soil with *Pratylenchus* and one without blended for different starting densities (very low, low, medium, high). After harvest soil sampled using tube samplers and analysed for soil plus root densities
- Morphological and Molecular identification:**
Sequencing: 28S D2-D3, ITS1&2 rDNA and 18S expansion segments (DNA Extracted from a single nematode)

Field Survey

Table 1. Frequency of positive fields for plant-parasitic nematodes recovered from commercial fields sampled in 2014 and 2015.

Taxa	Frequency	Mean Density	
		soil #/100g	plant #/1g
<i>Aphelenchooides</i>	0.7	32	3
Aphelenchidae	0.58	22	2
<i>Ditylenchus</i>	0.4	48	30
<i>Helicotylenchus</i>	0.19	105	-
<i>Longidorus</i>	0.01	7	-
Mertiniinae	0.01	10	-
<i>Paratrichodoros</i>	0.01	40	-
<i>Pratylenchus</i>	0.47	120	-
<i>Pratylenchus</i>	0.21	88	-
<i>Subanguina</i>	0.06	-	3
Telotylenchinae	0.65	79	-
<i>Xiphinema</i>	0.06	11	-
Number Fields	93		



Figure 1. Locations of commercial fields sampled in 2014 and 2015 (n= 93), with grey shaded area indicating approximate cropping area of the Canadian Prairie provinces.

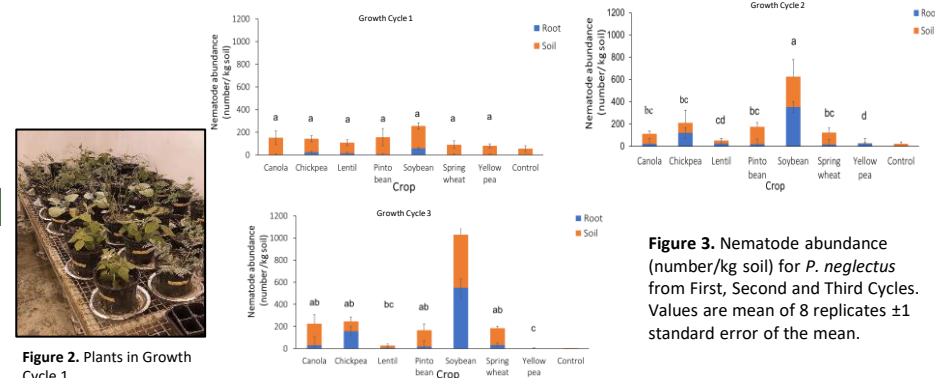
- Nineteen genera of plant-parasitic nematodes were recovered. The most significant plant nematode taxa recovered are given in Table 1.

Species Identification

- Ditylenchus* species was *D. weischeri* except for one field in MB with *D. dipsaci* in yellow pea
- Paratylenchus projectus* was identified from five fields in SK and one in AB.
- Paratylenchus nanus* was identified from one field in SK
- Pratylenchus* individuals from 4 fields in AB and 4 fields in SK were sequenced and identified as *P. neglectus*. Maximum densities of 6,300 and 1,270 *Pratylenchus*/kg dry soil were obtained for yellow pea and chickpea fields, respectively.
- Quinisulcius capitatus* was identified from four fields in AB and 1 in SK.

Host Screening Study

- P. neglectus* abundance remained near unchanged or increased after the 3 growth cycles for canola, chickpea, pinto bean, soybean and spring wheat (Fig. 3)
- P. neglectus* reproduced best on soybean (Reproductive Factor (Rf)=1.70), followed by canola (Rf=1.36) and chickpea (Rf=1.35)
- P. neglectus* was prevalent in roots of soybean and chickpea after each growth cycle
- Lentil and yellow pea were a poor host to *P. neglectus* (Rf<1) across all cycles
- P. neglectus* became near absent in unplanted soil after the 3 growth cycles



Soybean Microplot Study

- Starting densities of *Pratylenchus* were 15, 55, 80 and 125/100g soil
- In unplanted soil, densities declined by around 75% (Fig. 4)
- In soybean planted soil, densities were near that at starting (Fig. 4), meaning the nematode maintained its population on soybean

Species Identification

- DNA Sequencing was performed in 91 *Pratylenchus* individuals across the 3 studies (before, during and after the experiments' conclusion). All resulted in identification for *P. neglectus*.

Acknowledgements

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