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Research Article

Prevalence and abundance of plant-parasitic nematodes in New Zealand maize fields: effects of territory, soil orders, crop stage, and sampling time

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ABSTRACT

Plant-parasitic nematodes (PPNs) are significant agricultural pests that can reduce maize yields. This study examines the prevalence, abundance, and diversity of PPNs in New Zealand maize fields, focusing on the effects of territory, soil orders, crop stages, and sampling times. Seven PPN genera were identified: *Pratylenchus* spp. (root-lesion), *Helicotylenchus* spp. (spiral), *Meloidogyne* spp. (root-knot), *Heterodera* spp. (cyst),

Paratylenchus spp. (pin), *Criconemella* spp. (ring), and *Tylenchus* spp. PPNs were present in 98% of the samples, with *Pratylenchus* spp. being the most prevalent (91%), followed by *Helicotylenchus* spp. (38%). Compared to Waikato and Manawatu-Whanganui, Canterbury had the highest nematode populations, particularly of *Pratylenchus* spp. and *Helicotylenchus* spp. Brown and pallic soils supported higher PPN abundances. Sampling during the maize harvesting stage and late autumn resulted in the highest nematode populations and diversity indices. *Pratylenchus* spp. populations often exceeded the economic threshold of 500 *Pratylenchus* kg^{-1} of soil, suggesting a significant threat to maize yield in New Zealand. The findings highlight the need for further research to assess the impact of *Pratylenchus* spp. on maize yield and to develop effective management practices for maize cultivation in the country.

KEYWORDS: Plant-parasitic nematodes maize *Pratylenchus* nematode diversity soil orders crop stage sampling time lesion nematodes spiral nematodes New Zealand

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Disclosure statement

No potential conflict of interest was reported by the author(s).

Author contributions

NT took the lead in writing the manuscript. All authors provided critical feedback and helped shape the research, analysis, and manuscript.

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