

## Plant Science: A SURVEY OF PLANT-PARASITIC NEMATODES ASSOCIATED WITH WHEAT CROPS IN SOUTH AFRICA

Siphamandla Lamula - Unit-Environmental Sciences and Management,  
North-West University, South Africa

Siphamandla Lamula

### Abstract

Grain farming in Africa, especial in Sub-Saharan Africa is facing the combined effects of abiotic (including drought and poor crop management technology) and biotic (fungal diseases and pests) stresses. Among these, the cereal cyst nematodes (CCNs) (*Heterodera* spp.), root-knot nematodes (RKN) (*Meloidogyne* spp.) and root-lesion nematodes (RLN) (*Pratylenchus* spp.) are the main limiting factor for grain production and are considered as economically important for wheat worldwide and major facilitators of fungal infections such as fusarium species. Losses of cereals as a result of plant-parasitic nematodes (PPNs) are estimated up to 6.9 to 50% (\$US 125 billions) worldwide. The damage caused by these PPNs, their behaviour and control have received little attention in many African countries, especially Sub-Saharan African, in spite of indications by other countries that productivity of grains can be severely reduced. The aim of the current study is to identify the plant-parasitic nematode assemblages that occur in South African wheat producing areas with emphasis on morphological and molecular identification. A total of 776 composite rhizosphere soil and root samples have been collected from 24 localities over two seasons in the Free State (4), KwaZulu-Natal (1), Northern Cape (6) and Western Cape (13) provinces. Nematodes were extracted from soil and root samples by using the adapted decanting and sieving method, followed by an adapted sugar centrifugal method. Nematodes were extracted from kernels by means of soaking the samples in water for 24 hours and decanting the extract through a 20µm sieve. Nematode species were identified on the basis of morphometrics and morphological features, while Prominence Values (PV) was calculated for each genus or family. Individuals from the following genera/families/orders were identified from the following provinces: Free State: *Pratylenchus*, *Rotylenchus*,

*Scutellonema*, *Helicotylenchus*, *Criconema* and *Dolichodorus*; KwaZulu-Natal: *Meloidogyne*, *Pratylenchus*, *Criconema*, *Spiral* and *Longidorus*; Northern Cape: *Pratylenchus*, *Criconema* and *Spiral*; Western Cape: *Pratylenchus*, *Rotylenchus*, *Scutellonema*, *Helicotylenchus*, *Coslenchus*, *Tylenchus* and *Xiphinema*. The predominant genera identified across the localities to date according to PV-value are *Pratylenchus*, *Meloidogyne*, *Spiral*, *Coslenchus*, *Tylenchus*, *Criconema*, *Longidorus* and *Xiphinema*. Cedara in KwaZulu-Natal had a high number of *Meloidogyne* (420 second-stage juveniles /200 g soil) compared to the other sampled localities. Western Cape (Malmesbury) showed a high number of *Pratylenchus* sp. (8750/200 g soil). In root samples, the PV of *Meloidogyne* in Cedara was 183 followed by De Vlei (PV=943), Tygerhoek (PV=490), Kopporfontein (PV=134) and Wellington (PV=57) for *Pratylenchus* sp. No plant-parasitic nematodes were found in kernel samples. However, a bacterivore species of *Panagrolaimus* was identified from wheat kernels from Clarens in the Free State, being a first record both in South Africa and worldwide. The D2-D3, 18S rRNA, ITS, PCR and SCAR-PCR for amplification of detected genera is ongoing and thus far, among other economically important species such as *Pratylenchus thornei*, *Pratylenchus neglectus* and *Pratylenchus bolivianus* have been amplified and the data corresponds with that of morphological and morphometrical identifications. Due to their microscopic size, nematode pests are commonly overlooked or misdiagnosed.

This work is partly presented at 7th Global Summit on Plant Science, October 07-08, 2019, Madrid, Spain

Siphamandla Lamula  
Unit-Environmental Sciences and Management, North-West University, South Africa