Mondstuk van die Suid-Afrikaanse aartappelbedryf • Mouthpiece of the South African potato industry

CHIPS

VOL 35 NO 04 • JULY / AUGUST 2021

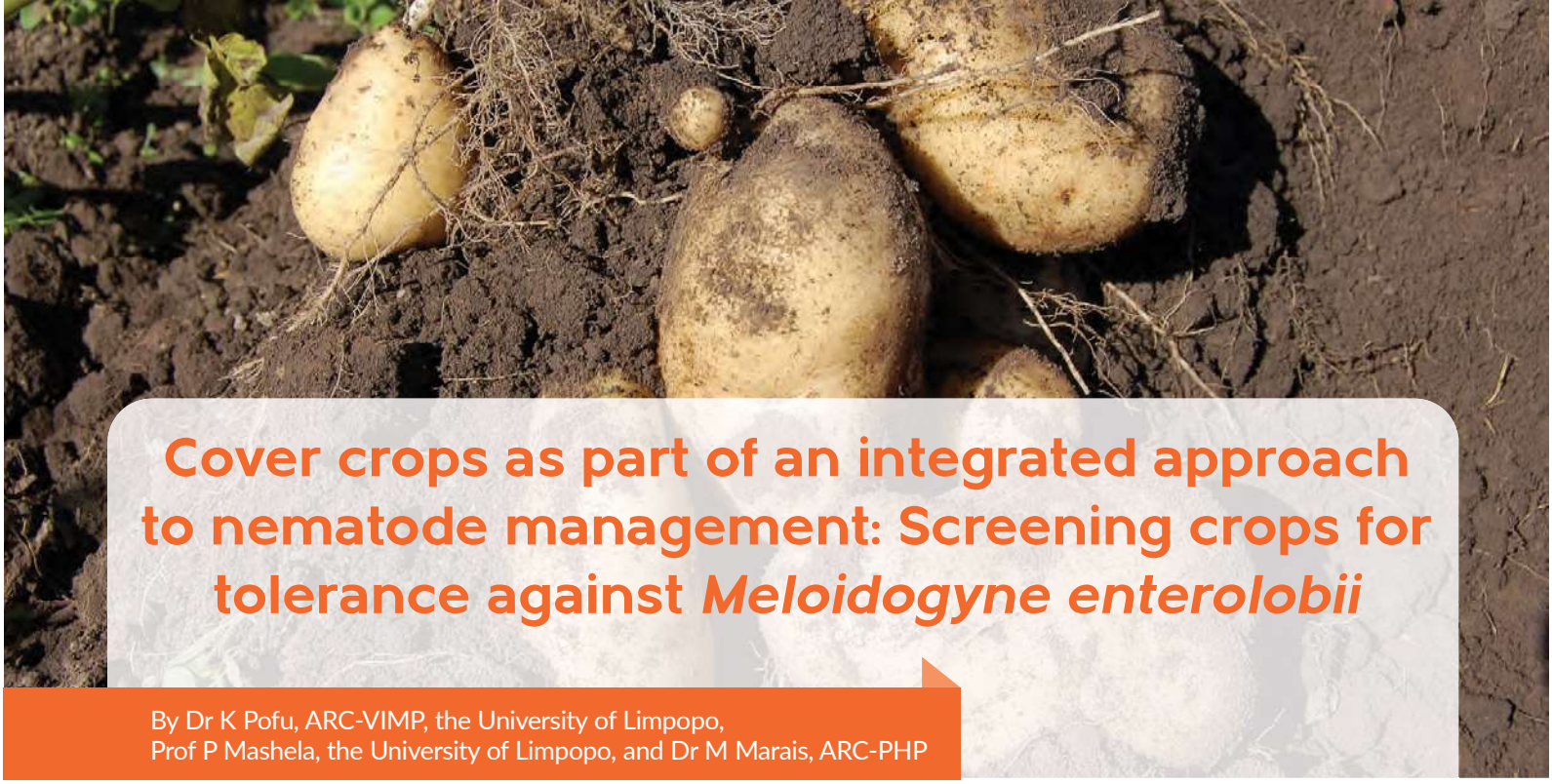
COVER CROPS AND NEMATODE MANAGEMENT: TOLERANCE TO *MELOIDOGYNE ENTEROLOBII*

WES-VRYSTAATSE KULTIVARPROEF ONDER BESPROEIING OP BULTFONTEIN

Pesticide maximum residue limits and market access

Tendense op varsproduktemarkte

PSA small grower development programme in Limpopo



Cover crops as part of an integrated approach to nematode management: Screening crops for tolerance against *Meloidogyne enterolobii*

By Dr K Pofu, ARC-VIMP, the University of Limpopo,
Prof P Mashela, the University of Limpopo, and Dr M Marais, ARC-PHP

Meloidogyne enterolobii (M. enterolobii) is a relatively unknown, aggressive root-knot nematode. In South Africa, root-knot nematodes are the most damaging genera of plant-parasitic nematodes in all potato producing regions, with *Meloidogyne incognita (M. incognita)* and *Meloidogyne javanica (M. javanica)* being widely distributed species.

However, the growing number of localities in South Africa at which *M. enterolobii* is reported, as well as its short life cycle of 15 days compared to the 30-day life cycle of its counterparts in the genus, compels the search for non-hosts of the nematode.

Figure 1: Cowpea cv. black-eyed under greenhouse conditions at 56 days after sowing.

M. enterolobii was first observed in guava orchards (*Psidium guajava*) and blackjack (*Bidens pilosa*) in Mpumalanga. It is now found in guava, potato, sweet pepper, pumpkin, tomato, beans, lettuce, chilli pepper, groundnuts, and the weeds *Bidens pilosa, Physalis viscosa, Alternaria pungens*, and *Guzotia abyssinica* in South Africa. It has since been shown to be more aggressive than other *Meloidogyne* species and can therefore be a devastating pest in crop production systems.

The objective of the study

The aim of the study was to screen for the host status of crops used as rotation crops by potato producers, as well as several cover crops against *M. enterolobii*. The research was conducted under greenhouse and field conditions at the University of Limpopo. The first results of greenhouse trials are reported in this article.

Crops tested included tillage radish, white Maluti oats, dolichos, forage sorghum, sunn hemp (*Crotalaria juncea*), black saia oats, stooling rye wintergrazer, sunflower, barley, *Crotalaria spectabilis*, forage rape, Japanese radish, common

vetch, Rhodes grass, velvet beans, *Eragrostis curvula (E. curvula)*, Tolgar Rhodes grass, sito white mustard, Tajuna radish, *Urochloa oligotricha* (var. 'Kuffer'), *Brachiaria nigropedata* (var. 'sweet velvet'), Cordoba radish, Pearler hybrid millet, power green stooling rye, Esterossa saia oats, SCALA brown mustard, and three commercially available cowpea cultivars, namely IT18, Dr Saunders and black-eyed.

Determining the host status

Potted plants were inoculated with 5 000 second-stage juveniles (J2) of *M. enterolobii* each. At harvest, 56 days after sowing, plants were removed from the soil and the roots were washed and weighed. Nematodes were extracted from the roots using standard nematode extraction methods.

The host status was assessed using the reproductive potential (RP) values, a proportion of eggs and J2 per gram of fresh root. Nematode population numbers are used to calculate the RP potential. If the RP is < 1, a crop is rated as non-host, whereas if the RP is > 1, it is classified as a host.

Promising initial results

Tillage radish, white Maluti oats, sunn hemp, common vetch and Tolgar Rhodes grass recorded RP values of less than one, suggesting that they were non-hosts to *M. enterolobii* and could be used in crop rotation systems. Forage sorghum and *E. curvula* had moderately low RP values of 1.99 and 1.14, respectively.

Cowpea cultivars IT18, Dr Saunders and black-eyed pea had the highest RP values of 335.26, 966.39, and 465.8, respectively. Crops with high RP values are hosts to *M. enterolobii* and should not be used in crop rotation intended to manage nematode population densities.

Cover crops for population control

A nematode-resistant cultivar for a particular region should preferably be resistant to all *Meloidogyne* species in the region, since in most cases, mixed populations co-exist. These crops could be used to manage high population densities of *M. enterolobii* where it occurs as a single species.

However, where it occurs as a mixed population with other *Meloidogyne* species, the test crops might not be suitable for use in potato crop rotation systems to manage other *Meloidogyne* species. Studies are currently under way to test the crops against *M. incognita* and *M. javanica*.

Prior to recommending the use of the aforementioned crops in rotation with potatoes, it is imperative that *Meloidogyne* species that are present in the soil of the target field, be identified.

For more information on nematode identification and sampling methods, contact Dr Marais at email MaraisM@arc.agric.za. For information regarding the trials and test crops, contact Dr Pofu at email Kgabo.Pofu@ul.ac.za.