



Plant nematodes in South Africa. 11. Checklist of plant nematodes of the protected areas of KwaZulu-Natal

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Nematodes are some of the most abundant soil organisms and are an essential part of soil ecology. These organisms are used as indicator organisms and can be linked to soil health. Biological collections contain vast amounts of data, with the National Collection of Nematodes housed at the Plant Protection Research Institute, Agricultural Research Council being no different. During the digitising of the collection a number of unpublished records of plant nematodes reported from protected areas in KwaZulu-Natal were found in the South African Plant-Parasitic Nematode Survey database. A total of 222 plant nematode species belonging to 39 genera were reported from the province, with only 94 of these species reported from the protected areas and 172 and 159 species reported from uncultivated (outside the protected areas) and cultivated areas, respectively. Only nine species, *Criconea silvum*, *Criconea talanum*, *Helicotylenchus marethae*, *Ogma dracomontanum*, *Ogma louisi*, *Ogma ueckermanni*, *Paralongidorus deborae*, *Trichodorus rinae* and *Xiphinemella marindae* were described from protected areas, whilst *O. dracomontanum*, *P. deborae* and *T. rinae* were subsequently also reported from other provinces.

Conservation implications: A higher degree of diversity of nematodes was observed in the unprotected areas of the province. The observation suggests that nematode fauna, and by implication also other invertebrates, are not adequately protected.

Introduction

Since the late 1950s nematodes were collected, identified and deposited in the National Collection of Nematodes at the Plant Protection Research Institute, Agricultural Research Council, Pretoria. Descriptions and locality data of new species were published, but the incidence of plant nematodes in the protected areas of KwaZulu-Natal was never consolidated in a single document as was done for a number of protected areas in other provinces (Botha & Heyns 1990; Van den Berg, Marais & Tiedt 2007; Van der Vegte & Heyns 1963). In 1987 the National Collection of Nematodes initiated the South African Plant-Parasitic Nematode Survey (SAPPNS) to record the biodiversity of plant nematodes in South Africa (Marais 2006). As part of this initiative, surveys were undertaken in various protected areas, including those in KwaZulu-Natal (Van den Berg 1992). During digitising the specimens of the National Collection of Nematodes, a number of unpublished records of plant nematodes reported from protected areas in KwaZulu-Natal were discovered.

Results and discussion

The checklist reflects collections between 1963 and 2006 from 18 protected areas in KwaZulu-Natal. The SAPPNS database contains 450 records of nematodes sampled in uncultivated areas in KwaZulu-Natal, of which 161 are from localities in protected areas (Online Appendix). The database also contains 580 records of localities sampled in cultivated areas, which include crop fields, plantations, gardens and sports fields. It was found that 94 plant nematode species were reported from protected areas (Table 1), 172 species from uncultivated areas (outside the protected areas) and 159 species from cultivated areas. In total, 222 different plant nematode species are currently reported for KwaZulu-Natal. Of these, 54 species were described for the province but only nine species were described for the protected areas in the province.

The classification of South African plant-parasitic nematodes followed here is a synthesis of the classification by Maggenti *et al.* (1988) for Tylenchina and Decraemer (1995) and Duarte *et al.* (2010) for Trichodoridae. The synonymisation of the genera *Longidoroides* and *Siddiqia* with *Paralongidorus*, as proposed by Escuer and Arias (1997), is accepted. Authorities for genera regarded as valid here are Marais (2001) for *Helicotylenchus*, Escuer and Arias (1997) for *Paralongidorus*, Brzeski (1998) for *Paratylenchus*, Handoo (2000) for *Tylenchorhynchus* and Hunt, Luc and Manzanilla-López (2005) for *Criconea*.

**TABLE 1:** Number of plant nematode species recorded from KwaZulu-Natal.

Family	Genera	KZN	Protected areas	Uncultivated areas (excluding the protected areas)	Cultivated areas (crops, plantations, sport fields)	Described from KZN	Reported from only KZN
Anguinidae	2	2	0	0	2	0	0
Dolichodoridae	3	3	0	0	0	0	2
Belonolaimidae	6	16	2	9	12	4	2
Pratylenchidae	4	17	6	9	14	1	2
Hoplolaimidae	5	40	22	34	28	1	0
Heteroderidae	2	8	1	6	6	2	2
Criconeematidae	6	47	29	42	33	11	6
Tylenchulidae	4	10	2	4	8	3	2
Trichodoridae	3	10	4	9	6	3	3
Longidoridae	3	68	27	58	50	28	7
Tylencholaimidae	1	1	1	1	0	1	1
Total number of plant nematode species	-	222	94	172	159	54	27

KZN, KwaZulu-Natal.

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Competing interests

The authors declare that they have no financial or personal relationship(s) that may have inappropriately influenced them in writing this article.

Authors' contributions

M.M. (ARC-Plant Protection Research Institute) is the co-ordinator of the SAPPNS, project leader of digitising the National Collection of Nematodes and taxonomist responsible for *Helicotylenchus* and Belonolaimidae, Dolichoridae, Trichodoridae and the subfamily Meloidogyninae. M.M. was responsible for writing the draft concept of the manuscript. A.S. (ARC-Plant Protection Research Institute) is the taxonomist responsible for the Longidoridae, Anguinidae, Aphelenchoididae and the subfamily Heteroderinae at the Collection and was responsible for the final review of the manuscript. M.M. and A.S. both contributed to writing the article.

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