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ISSN: 0191-2917

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Editor-in-Chief: Alison E. Robertson
Published by The American Phytopathological Society

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Posted online on 27 Jan 2017.
<http://dx.doi.org/10.1094/PDIS-09-16-1303-PDN>

DISEASE NOTES

First Report of *Meloidogyne ethiopica* Parasitizing Sugarcane in Brazil

C. Bellé¹, Doutorando em Fitossanidade, Universidade Federal de Pelotas, 96010-900, Pelotas, RS, Brazil; **S. M. Kulczynski**, Universidade Federal de Santa Maria, Frederico Westphalen, 98400-000, RS, Brazil; **P. R. Kuhn**, EPAGRI, 89893-000, Mondai, SC, Brazil; **R. M. D. G. Carneiro**, Embrapa Recursos Genéticos e Biotecnologia, 70770-91, Brasília, DF, Brazil; and **I. Lima-Medina** and **C. B. Gomes**, Embrapa Clima Temperado, 96010-971, Pelotas, RS, Brazil.

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ABSTRACT

Root-knot nematodes (*Meloidogyne* spp.) cause serious damage to sugarcane (*Saccharum* spp.) plantations in different growing regions of Brazil (Bellé et al. 2014). In December 2013, sugarcane plants (cvs. RB835486, RB72454, and Nova Irai) exhibiting many galls in the roots were detected and sampled in areas from Frederico Westphalen (27°34'S, 53°34'W), Vicente Dutra (27°19'S, 53°39'W), and Caiçara (27°28'S, 53°40'W) municipalities, northwest Rio Grande do Sul State, Brazil. No symptoms were observed in the aerial part of infected sugarcane plants. Individual *Meloidogyne* females were extracted from the root samples and used for species identification by electrophoresis ($n = 40$) according to the technique described by Carneiro and Almeida (2001). Subsequently, egg masses from the females of each sample were inoculated on to tomato plants (cv. Rutgers) for later complementary studies: perineal morphology ($n = 20$ /sample) and measurement of second stage juveniles (J2) ($n = 20$ /sample). Species identification was confirmed by PCR species-specific SCAR using a primer set meth-F (5'-ATGCAGCCGACGGGAACGTAGTT-3') and meth-R (3'-TGTTGTTTCATGTGCTTCGGC-5') (Correa et al. 2014). In addition, the root samples were processed to determine the number of *Meloidogyne* eggs and J2s. The nematode population densities in the samples ranged from 320 to 621 eggs plus J2/5 g of roots. The isozyme electrophoresis analyses revealed the esterase phenotype E3 (Rm = 0.92, 1.15, 1.32) that is typical for *Meloidogyne ethiopica* Whitehead 1968. The female perineal patterns showed moderately high to high dorsal arch, thick and separated striae from mild to wavy, and an undivided lateral field, similar to the one in *M. ethiopica* redescription. The juvenile mean body length was $480.42 \pm 10.1 \mu\text{m}$, the stylet length was $11.7 \pm 0.3 \mu\text{m}$, and the tail length $63.9 \pm 0.8 \mu\text{m}$, with 12.1 to $14.9 \mu\text{m}$ long hyaline region. The PCR-SCAR product was ~350 bp, which was previously reported only for *M. ethiopica* (Correa et al. 2014). The esterase phenotype, species-specific SCAR, morphometric and morphological characteristics in all *Meloidogyne* populations studied here were consistent with those reported for *M. ethiopica* (Carneiro et al. 2004; Correa et al. 2014; Whitehead 1968). In greenhouse tests, sugarcane plants cv. RB72454 maintained in pots with sterilized soil were inoculated with 5,000 eggs plus J2s of the original population of *M. ethiopica* using six replicates; a

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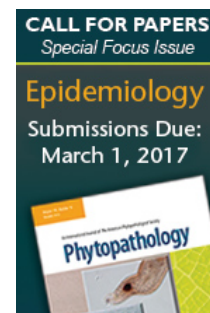
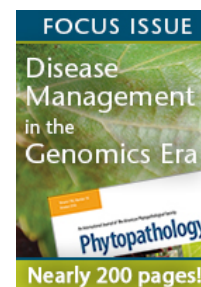
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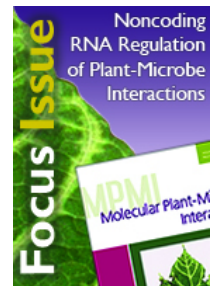
First Look: 5 Dec 2016

Accepted: 23 Nov 2016

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noninoculated control was included. Seventy days later, all inoculated plants showed symptoms of stunting, a reduced fresh weight of shoots and roots, and a decrease in plant height of about 60% compared with the noninoculated control. Galling symptoms on the roots were similar to those in the field, and the nematode reproduction factor (final population/initial population) was 16.6. The noninoculated plants did not exhibit galls and their development was not affected. These results confirmed the pathogenicity of *M. ethiopica* on sugarcane. This is the first report of *M. ethiopica* parasitizing sugarcane roots worldwide, and this finding has great importance for Brazilian agriculture, considering this nematode may damage sugarcane plants and become an additional problem for this crop.



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