Diseases Caused by Nematodes

First Report of the Root-Knot Nematode *Meloidogyne enterolobii* on Sweet Potato in Guangxi Province, China

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Sweet potato (*Ipomoea batatas* Lam.) is the seventh most widely cultivated food crop in the world and the sixth most widely cultivated food crop in China. In June 2021, sweet potato plants were found to be displaying nutrient deficiencies with red leaves in a sweet potato field in Hepu County, Beihai City, Guangxi Province (21°37'43.41"N, 109°10'58.74"E). Black, irregular protuberant scars on tubers and nodular galls on roots were found. Thirty-five sweet potato 'Variety Guizhiweishu No. 1' tubers were randomly collected and 97% were infected with root-knot nematodes. Females ($n = 20$) had perineal patterns that were oval, with moderate to high dorsal arches; the lateral field was not obvious or absent. Morphological measurement of females ($n = 20$) were made from micrographs taken with a microscope (Axio Imager, Z2; Zeiss). Measurements (mean $\pm$ standard error) were body length (BL) = 932.8 ± 18.4 μ m, maximum body width (BW) = 588.8 ± 22.0 μ m, vulval slit length = 19.6 ± 0.6 μ m, and vulval slit to anus distance = 22.3 ± 0.8 μ m. Morphological measurements of second-stage juveniles (J2; $n = 20$) were BL = 512.0 ± 5.9 μ m, BW = 17.4 ± 0.6 μ m, stylet length = 13.4 ± 0.2 μ m, dorsal pharyngeal gland orifice to stylet base = 3.4 ± 0.0 μ m, and hyaline tail length = 17.6 ± 0.5 μ m. These morphological characteristics fit those of the original description for *Meloidogyne enterolobii* (Yang and Eisenback 1983). Molecular analyses were conducted to confirm species identification. Genomic DNA was extracted from 12 single J2 (Luo et al. 2020). The rDNA internal transcribed spacer (ITS) region was sequenced using primer pair V5367/26S (5'-TTGATTACGTCCCTGCCCTTT-3'/5'-TTTCACTCGCCGTTTAC TAAGG-3') (Vrain et al. 1992), and the D2-D3 fragment of the 28S rRNA genes was sequenced using primer pair D2A/D3B (5'-GTACCGTGAGG

GAAAGTTG-3'/5'-TCGGAAGGAACCACTACTA-3') (De Ley et al. 1999). The target gene sequences were 733 bp (GenBank accession no. MZ413814) and 733 bp (MZ411468), respectively; they were all 99 to 100% similar to those of *M. enterolobii* sequences available in the GenBank. Species identification was also confirmed using PCR to amplify rDNA-IGS2 with *M. enterolobii*-specific primer pair Me-F/Me-R (5'-AACTTTTGTGA AAGTGCCGCTG-3'/5'-TCAGTTCAGGCAGGATCAACC-3'). The electrophoresis results showed a bright band (~200 bp) only in the lane with the *M. enterolobii*-specific primers, similar in size to that previously reported for *M. enterolobii* (Long et al. 2006). Therefore, this *Meloidogyne* sp. population on sweet potato was identified as *M. enterolobii* based on its morphological and molecular characteristics. To verify the pathogenicity of nematodes, sweet potato Variety Guizhiweishu No. 1 seedlings were individually planted in plastic pots (18 cm in diameter and 11 cm deep) containing 1,000 cm³ of autoclaved sandy soil (sand/soil = 3:1). In total, 15 seedlings were inoculated with 10,000 eggs (the population was the same as the nematode population in soil in the field) and 5 seedlings without eggs were used as a control. Plants were maintained at 25 to 28°C in a greenhouse. After 2 months, roots of inoculated plants exhibited elongated swellings similar to symptoms observed in the field. The noninoculated plants did not have any galls or swelling. A reproduction factor (nematode final population density/initial population density) value of 18.6 was obtained. These results confirmed the nematodes' pathogenicity. To our knowledge, this is the first report of *M. enterolobii* on a member of the Convolvulaceae family in Guangxi Province. In 2014, the nematode on sweet potato was reported in Guangdong Province (Gao et al. 2014). Guangxi Province is the largest producer of sweet potato in south China and is the third top producing region in the whole country. *M. enterolobii* is a potential risk to the production of sweet potato in this region, and control measures are needed to prevent any further spread.

References:

- De Ley, P., et al. 1999. Nematology 1:591.
- Gao, B., et al. 2014. Plant Dis. 98:702.
- Long, H., et al. 2006. Acta Phytopathol. Sin. 36:109.
- Luo, M., et al. 2020. Plant Pathol. J. 36:297.
- Vrain, T. C., et al. 1992. Fundam. Appl. Nematol. 15:563.
- Yang, B. J., and Eisenback, J. D. 1983. J. Nematol. 15:381.

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