**First Report of** *Meloidogyne incognita* **Infecting Spinach in Southern Spain.** P. Castillo and R. M. Jiménez-Díaz, Instituto de Agricultura Sostenible (IAS), Consejo Superior de Investigaciones Cientificas (CSIC), Apdo. 4084, 14080 Córdoba, Spain. Plant Dis. 87:874, 2003; published on-line as D-2003-0501-01N, 2003. Accepted for publication 17 April 2003.

## e**-X**tra

Severe plant yellowing and decline were recently observed in two commercial fields of spinach (*Spinacia oleracea* cv. Polka) in Encinarejo (Córdoba), southern Spain. Disease surveys revealed severe infections of main and feeder roots and a large soil population of the southern root-knot nematode *Meloidogyne incognita*. The nematode population was extracted and quantified from soil and root samples according to Barker (1) and identified by female perineal pattern, phenotype esterases, and host-differential test (3,4). *M. incognita* was found in 100% of soil samples and 85.7% of root samples with nematode population densities ranging from 44 to 378 eggs and second-stage juveniles (J2s) per 100 cm(^3) of soil and 162 to 725 eggs and J2s per 5 g of fresh roots. Infected roots showed large, regular galls on root tips and also along the main root axis and secondary feeder roots. Galling of root tips prevents further root growth into deeper soil layers and induced proliferation of secondary roots. The severe infections in roots of spinach suggest that parasitism of spinach roots by the nematode must contribute to stunting, yellowing, and decline of spinach as previously reported (2). To our knowledge, this is the first report of *M. incognita* infecting spinach in Spain.

*References:* (1) K. R. Barker. Nematode extraction and bioassays. Page 19 in: An Advanced Treatise on Meloidogyne. Vol. II, Methodology. K. R. Barker, C. C. Carter, and J. N. Sasser, eds. North Carolina State University Graphics, Raleigh, 1985. (2) J. C. Correll et al. Plant Dis. 78:653, 1994. (3) P. R. Esbenshade and A. C. Triantaphyllou. J. Nematol. 22:10, 1990. (4) K. M. Hartman and J. N. Sasser. Identification of Meloidogyne species on the basis of differential host test and perineal pattern. Page 69 in: An Advanced Treatise on Meloidogyne. Vol. II, Methodology. K. R. Barker, C. C. Carter, and J. N. Sasser, eds. North Carolina State University Graphics, Raleigh, 1985.



A, Field symptoms of stunting and yellowing of spinach severely infected by *Meloidogyne incognita*.
B, C, Diseased spinach plants showing complete root system severely galled.
D-H, Severe galling on main and feeder roots of spinach.

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