exeley

Article | DOI: 10.21307/jofnem-2019-060

JOURNAL OF NEMATOLOGY

e2019-60 | Vol. 51

First Report of *Meloidogyne ethiopica* and *M. javanica* in *Rumex* spp. in Rio Grande do Sul State, Brazil

L. A. Yánez Márquez[1,*], M. Divers[1], W. R. Silva[1], J. V. de Araújo Filho[1] and C. B. Gomes[2]

[1]Departamento de Fitopatologia, Universidade Federal de Pelotas, 96010-900, Pelotas, RS, Brazil.

[2]Embrapa Clima Temperado, C.P. 403, Pelotas, RS 96001-970, Brazil.

*E-mail: alejandroyanez91@yahoo.com

This paper was edited by Zafar Ahmad Handoo.

Received for publication May 7, 2019.

Keywords
Brazil, identified, nematodes, root-knot.

Rumex spp. is a common weed in the southern of the Brazil, where it infests pastures, annuals crop and orchards. In September 2017, *Rumex* plants with root-knot disease were collected in the municipality of Pelotas, state of Rio Grande do Sul, Brazil. Initially, specimens were obtained by Coolen and D'Herde (1972) and later identified through morphological studies and esterase phenotypes (Carneiro and Almeida, 2001). Perineal patterns were consistent with *Meloidogyne ethiopica* (Whitehead, 1968) and *M. javanica* (Treub, 1885) (Chitwood, 1949). To *M. ethiopica*, perineal patterns were oval to squarish, with striae widely separated, smooth to wary and phasmids were distinct. Dorsal arch moderately high to high, rounded to squarish. In relation to *M. javanica*, perineal patterns were rounded with flattened dorsal arch, with distinct lateral lines, separating it into dorsal and ventral regions. From the esterase electrophoresis we obtained E3 (Rm:0.9;1.1;1.25) and J3 (Rm:1.0;1.25;1.4) phenotypes, typical from *M. ethiopica* (Randig et al., 2004) and *M. javanica*, respectively. The second-stage juveniles ($n = 20$) had the following morphometric characters: $L = 392.3$ (359–426.9) µm, stylet = 13 (12.1–13.5) µm, DGO = 2.4 (2–2.9) µm, tail length 58.6 (51.2–66.3) µm, hyaline tail terminus = 13.1 (12.2–14.3) µm, $a = 22.2$ (19–23.5) µm, and $c = 6.7$ (5.7–7.6) for *M. ethiopica*, and: $L = 439.6$ (438.2–511.4) µm, stylet = 14.6 (14.4–15.3) µm, DGO = 4 (2.6–4.9) µm, tail length = 55.6 (51.5–61.6) µm, hyaline tail terminus = 13.4 (11.2–18.5) µm, for *M. javanica*. Under greenhouse, *Rumex* plants were inoculated with 5,000 eggs plus J2s (*Pi*) of the original population of *M. ethiopica* and *M. javanica* (three replicates) and non-inoculated plants were included. After 90 days, plants showed root galls were evaluated and final population (*Pf*) was estimated. The reproduction factor ($RF = Pf/Pi$) was 50.40 and 43.40 for *M. ethiopica* and *M. javanica*, respectively. The non-inoculated plants did not present root galls. These results confirmed the nematode's pathogenicity on *Rumex* spp. In 2003, it was the first record of *Meloidogyne ethiopica* in Kiwi (*Actinidia deliciosa*) fruit plants in Serra Gaúcha region (Carneiro et al., 2003). In Pakistan, Ahmad et al. (2015) reported occurrence of *M. javanica* on *Rumex crispus*, but we did not found record of *M. ethiopica*. Gharabadiyan et al. (2012) considered *Rumex acetosa* a good host only for *M. arenaria* race 2. *Rumex acetosella* has been classified as susceptible to *M. javanica* (Ansari et al., 2019). To the best of our knowledge, this is the first report of *M. ethiopica*

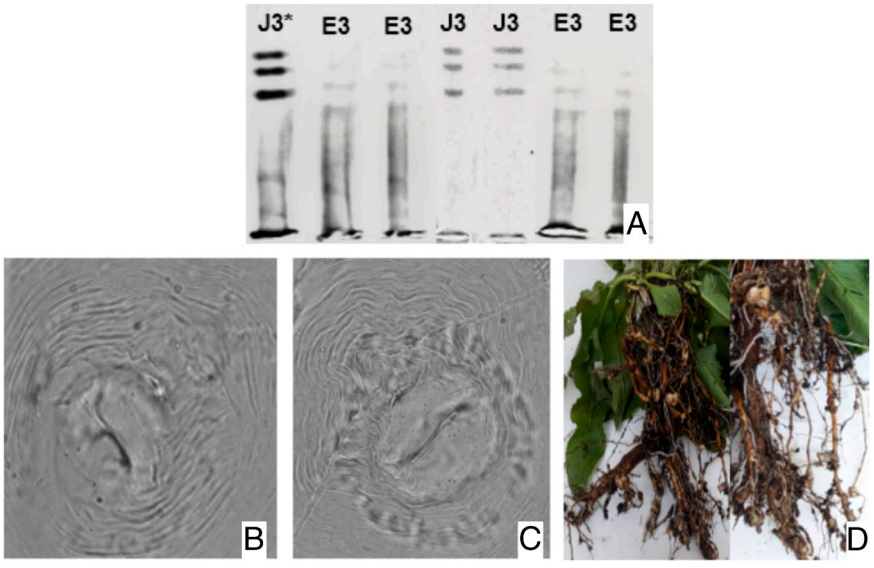

Figure 1: (A) Esterase phenotypes of *Meloidogyne* isolates detected in bitter dock (E3: *Meloidogyne ethiopica*; J3: *M. javanica*; J3*: *M. javanica* reference isolate). (B) Perineal pattern of *M. ethiopica*, (C) Perineal pattern of *M. javanica*, (D) Bitter dock symptomatic with root-knot.

and *M. javanica* parasitizing *Rumex* spp. roots in Brazil. This finding has a great importance, since to predict one host potential of nematodes in agricultural areas (Fig. 1).

References

Ahmad, I., Saifullah, M. A., Khan, I. A., Ali, R., Abbas, A., Khan, M. and Ali, A. 2015. Incidence of root-knot nematode in winter weeds of tomato in Malakand division – Pakistan. Journal Entomology and Zoology Studies 3(6):385 – 91.

Ansari, S., Charehgani, H. and Ghaderi, R. 2019. Resistance of ten common medicinal plants to the root-knot nematode *Meloidogyne javanica*. Hellenic Plant Protection Journal 12(1):6–11.

Carneiro, R. M. D. G. and Almeida, M. R. A. 2001. Técnica de eletroforese usada no estudo de enzimas dos nematóides de galhas para identificação de espécies. Nematologia Brasileira 25(1):35 – 44.

Carneiro, R. M. D. G., Gomes, C. B., Almeida, M. R. A., Gomes, A. C. M. M. and Martins, I. 2003. Primeiro registro de *Meloidogyne ethiopica* Whitehead, 1968, em plantas de quivi no Brasil e reação de diferentes plantas hospedeiras. Nematologia Brasileira 27:151 – 8.

Coolen, W. A. and D'Herde, C. J. 1972. A method for the quantitative extraction of nematodes from plant tissue. Ghent State Agriculture Research Centre.

Chitwood, B. G. 1949. Root-knot nematodes – Part 1. A revision of the genus Meloidogyne Goeldi, 1887. Proceedings of the Helminthological Society of Washington 16:90–104.

Gharabadiyan, F., Jamali, S., Yazdi, A., Hadizadeh, M. and Eskandari, A. 2012. Weed hosts of root-knot nematodes in tomato fields. Journal of plant protection research 52(2):230 – 4.

Randig, O., Almeida, M. R., Gomes, A. C. and Carneiro, R. 2004. Additional information on *Meloidogyne ethiopica* Whitehead, 1968 (Tylenchida: Meloidogynidae), a root-knot nematode parasitising kiwi fruit and grape-vine from Brazil and Chile. Nematology 6(1):109 – 23.

Treub, M. 1885. Onderzoekingen over Sereh-Ziek Suikkeriet gedaan in s'Lands Plantentium te Buitenzorg. Mededeelingen uit's Lands Plantentium, Batavia 2:1 – 39.

Whitehead, A. G. 1968. Taxonomy of Meloidogyne (Nematodea: Heteroderidae) with descriptions of four new species. Transactions of the Zoological Society of London 31:263 – 401.