

Research Note

Occurrence of the root-knot nematode *Meloidogyne arenaria* on balm and in a mixed population with *M. javanica* on grapevine in Greece

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Summary

The root-knot nematode *Meloidogyne arenaria* was found in Greece infecting balm (*Melissa officinalis* L.) and grapevine (*Vitis vinifera* L.). The isolate from balm was *M. arenaria* while the one from grapevine was a mixture of *M. arenaria* and *M. javanica* (prevalent species). This is the first report of the *M. arenaria* species in the country in which identification was based on biochemical methods and its occurrence on balm is a new host record.

Key words: esterase phenotypes; *Melissa officinalis*; *Vitis vinifera*

Root-knot nematodes (RKN), *Meloidogyne* spp., are among the most economically important nematodes in agriculture with a wide host range (Oka *et al.*, 2000; Karsen & Moens, 2006).

In Greece, RKN have been found in several areas and their identification was based on morphological and morphometric characters and/or differential host tests. Morphological identification of *Meloidogyne* species is a difficult task, even for qualified taxonomists with expertise in the genus, while esterase phenotypes of several RKN are species specific and can be used as reliable taxonomic characters (Esbenshade & Triantaphyllou, 1990; Pais & Abrantes, 1989). To date, the only records of *Meloidogyne* populations from Greece, in which biochemical and molecular methods were used for their identification, are referred to *M. javanica* (Treub) Chitwood and *M. incognita* (Kofoid and White) Chitwood found in vegetable crops (Tzortzakakis *et al.*, 1999, 2005).

In autumn 2004, galls of RKN were found in roots of grapevine (*Vitis vinifera* L.) and surrounding tomatoes and egg plants grown in a home yard in Crete (southern Greece). In summer 2005, some plants of a balm crop (*Melissa officinalis* L.) in Thrace (northern Greece) showed

symptoms of stunting and wilting. The roots of the balm plants were examined and the presence of RKN galls was detected. Galled root samples of grapevine and balm plants were taken and egg masses were collected. The RKN isolates were bulked up by inoculating egg masses on to the susceptible tomato (*Lycopersicon esculentum* Mill.) cv ACE. Every two months the plants were uprooted and egg masses of each isolate were transferred to new plants. The plants were maintained in a controlled environment growth room with 16 h photoperiod at 23 – 25 °C.

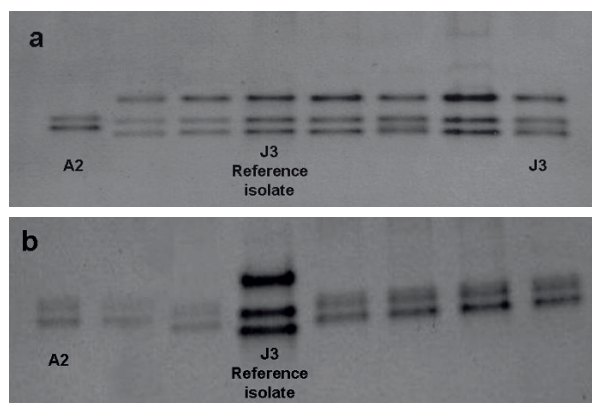


Fig. 1. Esterase phenotypes of *Meloidogyne* isolates detected in a) grapevine (A2-*M. arenaria* and J3-*M. javanica*) and b) balm (A2-*M. arenaria*)

The identification of these RKN isolates was based on perineal patterns morphology and esterase phenotypes of females extracted from tomato infected roots (Hartmann & Sasser, 1985; Esbenshade & Triantaphyllou, 1985; Pais *et al.*, 1986). The esterase phenotype designated as J3 and A2 were recognized in the isolate from grapevine and the phenotype A2 in the isolate from balm (Fig. 1) The J3 phenotype is specific for *M. javanica* isolates and the A2

has been associated with *M. arenaria* (Neal) Chitwood isolates (Esbenshade & Triantaphyllou, 1985). The isolate from grapevine exhibited typical *M. javanica* and *M. arenaria* perineal patterns and the isolate from balm had *M. arenaria* perineal patterns. Thus the isolate from grapevine was a mixture of *M. javanica* (prevalent species) and *M. arenaria* and the isolate from balm was *M. arenaria*.

M. arenaria from balm was assayed for its virulence towards the resistant *Mi* gene of tomato. Four week old seedlings of the tomato cv Silvana (with the *Mi* gene) grown in 300 ml pots were inoculated with 300 second-stage juveniles. The susceptible tomato cv ACE was used as control. Each treatment was replicated five times and the plants were transferred to a controlled growth room (23 – 25 °C and 16 h day). Eight weeks after inoculation, plants were removed from their pots and their roots checked for galls and egg masses. Several galls and egg masses were observed on the susceptible tomato cultivar but there was none on the resistant one.

Meloidogyne arenaria is a polyphagous species of RKN pathogenic to various vegetable, ornamental and fruit crops in the Mediterranean region (Lamberti, 1981). In Greece the species has been found previously on ornamentals and vegetables in several areas (Kyrou, 1963; Hirschmann *et al.*, 1966; Koliopanos & Kalyviotis-Gazelas, 1969, 1979; Koliopanos & Vovlas, 1977; Koliopanos, 1978, 1980; Pyrowolakis, 1980; Kalyviotis-Gazelas, 1981). This is the first record of *M. arenaria* on balm and the second on grapevine, on which, it had been first reported by Hirschmann *et al.* in 1966. The isolate obtained from balm probably originated from the previous crops of maize and tobacco, which are good hosts for *M. arenaria*.

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