

OBSERVATIONS ON *MELOIDOGYNE* SPP. AFFECTING JAPANESE MINT: NEW HOST RECORDS¹

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RESUMEN

Haseeb, A., y R. Pandey. 1989. Observaciones sobre *Meloidogyne* spp. que afectan la menta japonesa: Nuevo registro de hospederos. Nematropica 19:93-97.

Un muestro para los nematodos de las agallas (*Meloidogyne incognita* y *M. javanica*) en la menta japonesa (*Mentha arvensis*) se llevo a cabo desde 1983 hasta 1987 en el Central Institute of Medicinal and Aromatic Plants (CIMAP), Lucknow, y en la región Tarai de Uttar Pradesh. *Meloidogyne incognita* y *M. javanica* se encontraron en la menta japonesa primero en el CIMAP, Lucknow y luego en las cercanías de Lucknow, Pantnagar, Rampur, Saharanpur, Moradabad, y Badaun. La infestación más alta ocurrió en Lucknow y en Moradabad, y la más bajas en Pantnagar. *Meloidogyne incognita* fue más común que *M. javanica* en muchos de los cultivares de la menta japonesa.

Palabras claves: distribución de nematodos, hierba aromática, *Meloidogyne incognita*, *M. javanica*, *Mentha arvensis*, nematodo de las agallas.

Japanese mint (*Mentha arvensis* L. sub. sp. *haplocalyx* Briquet var. *piperascens* Holmes) is an important oil bearing crop which is cultivated on a large scale in tropical and subtropical countries of the world. The oil and its principal constituent, menthol is used in flavoring, perfumes, cosmetics, and pharmaceuticals. In recent years, cultivation of Japanese mint has increased in India, especially in the Tarai region of Uttar Pradesh, Punjab, and Haryana. The crop is planted during January and February and fits well into a multiple cropping system. Following the introduction of this crop and subsequent monoculture for several years, crop production has decreased. Root-knot nematode (*Meloidogyne* spp.) recently have been recognized as a serious threat to the productivity of medicinal and aromatic plants (2-7), but little information is available on the association of plant-parasitic nematodes with mints (1,8). It was imperative to identify the *Meloidogyne* spp. associated with *M. arvensis* and to assess the incidence and severity of root-knot of Japanese mint.

A survey of *M. arvensis* was conducted from 1983-1987 at the Central Institute of Medicinal and Aromatic Plants (CIMAP), Lucknow and the Tarai region of Uttar Pradesh (Pantnagar, Rudurpur, Kashipur,

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Rampur, Saharanpur, Sambhal, Moradabad, and Badaun). Chlorotic, stunted plants were dug and gall indices and *Meloidogyne* species identification determined. The degree of galling was rated as: 0 = no galling; 1 = 1–25%; 2 = 26–50%; 3 = 51–75%; and 4 = 76–100% of roots galled (11). One hundred mature female nematodes were dissected out of galled roots of *M. arvensis*. cvs. MA-1, MA-2, MA-3, MA-4, MA-5, MAS-1, MAS-2, MAS-25, MAS-36, MAS-77, MAS-95, MAS-139, MAS-140, MAS-141, MAS-155, and MAS-189. Perineal patterns of these females were prepared using acid fuchsin (0.01%) in lactophenol (10).

Initial symptoms were occasional yellowing of leaves which within a month's time a large portion of the foliage became completely affected. Growth seemed to cease soon after yellowing. Patches of severely stunted plants were observed frequently. Gall indices varied (Table 1), but rootlets and root hairs were conspicuously reduced (Figs. 1; 2A,B). Variation in the severity of infection differed among locations. The most severe infection occurred at Lucknow and Moradabad whereas the least severe was at Pantnagar.

A detailed study of perineal patterns of several hundred females revealed that the root-knot species attacking the different cultivars of Japanese mint reported herein were *Meloidogyne incognita* (Kofoid &

Table 1. Gall index and ratio of *Meloidogyne incognita* to *M. javanica* on Japanese mint (*Mentha arvensis*) cultivars in Uttar Pradesh, India.

Cultivars	Gall index ^x	Ratio of <i>M. incognita</i> ^y to <i>M. javanica</i>
MA-1	3.0	9:1
MA-2	4.0	7:3
MA-3	3.0	7:3
MA-4	4.0	3:2
MA-5	2.0	9:1
MAS-1 ^z	4.0	7:3
MAS-2	3.0	3:2
MAS-25	4.0	3:2
MAS-36	4.0	4:1
MAS-77	4.0	7:3
MAS-95	2.0	9:1
MAS-139	3.0	4:1
MAS-140	4.0	7:3
MAS-141	3.0	4:1
MAS-155	4.0	3:2
MAS-189	4.0	4:1

^xIndex based on a 0–4 system where 0 = no galls; 1 = 1–25; 2 = 26–50; 3 = 51–75; and 4 = 76–100% of roots galled (11).

^ySpecies identification based on perineal patterns of females dissected from each cultivar.

^zCultivar MAS-1 was grown in different Tarai region of Uttar Pradesh (Pantnagar, Rudurpur, Kashipur, Rampur, Saharanpur, Sambhal, Moradabad, and Badaun); the other cultivars were grown in different experimental plots at CIMAP, Lucknow.



Fig. 1. Noninfected (ni) and root-knot infected (i) Japanese mint *Mentha arvensis* cv. MAS-1.

White) Chitwood and *M. javanica* (Treb) Chitwood. Japanese mint is a new host record for both *M. incognita* and *M. javanica* (2-5). Both *M. incognita* and *M. javanica* were found at all locations. Although the occurrence of the species varied among cultivars, *M. incognita* was more prevalent than *M. javanica* (Table 1). Variation in the severity of infection may be due to differences in cultivar susceptibility (12) and environmental conditions, particularly variation in soil texture (9, 13). Further studies to elucidate the interrelationship of *M. incognita* and *M. javanica* are in progress at CIMAP.



Fig. 1. Noninfected (ni) and root-knot infected (i) Japanese mint *Mentha arvensis* cv. MAS-1.

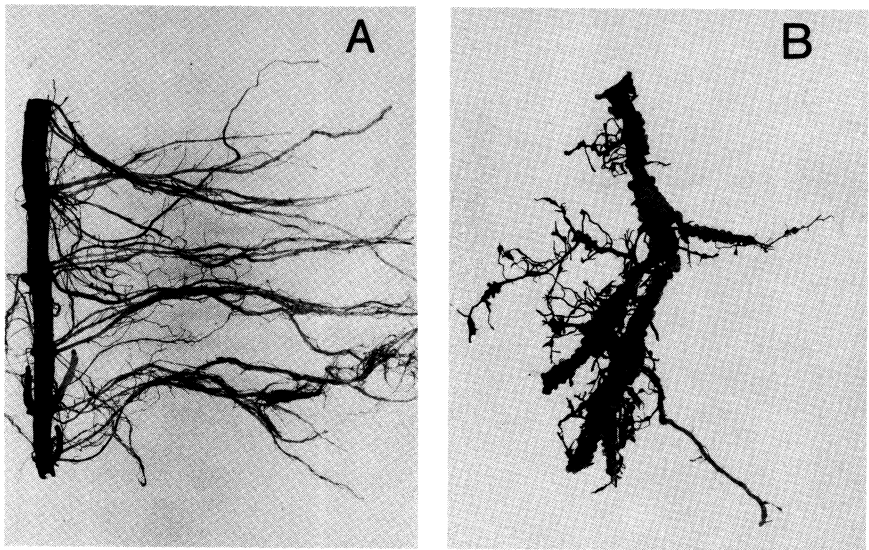


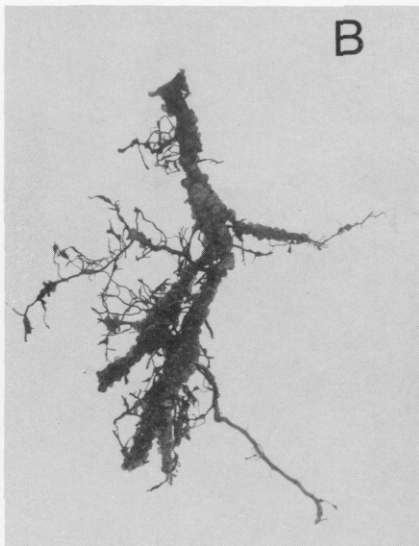
Fig. 2A, B. Roots of Japanese mint (*Mentha arvensis*) cv. MAS-1. A) Noninfected root and B) root-knot infected root showing galling and egg masses.

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A



B

Fig. 2A, B. Roots of Japanese mint (*Mentha arvensis*) cv. MAS-1. A) Noninfected root and B) root-knot infected root showing galling and egg masses.

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