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## Effect of root-knot nematode *Meloidogyne javanica* (Treub) Chitwood in vine nurseries

by

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### L'effet de l'espèce *Meloidogyne javanica* sur des racinés de vigne

**Résumé.** — Dans une pépinière expérimentale de l'Institut de la Vigne à Lykovrissi (Attique), des racinés ont été attaqués par nématodes de l'espèce *Meloidogyne javanica*. Une telle attaque a été observée pour la première fois en Grèce.

Les résultats obtenus ont révélé une correspondance entre la densité de la population du nématode et le pourcentage des racinés endommagées, ainsi qu'une résistance variétale différante au parasite entre les porte-greffes étudiées.

### Introduction

Reports on nematodes attacking the root system of vines are numerous. In the U.S.A., RASKI reported, in 1955, that the species *M. incognita* var. *acrita*, and *M. javanica*, have been demonstrated to be considered a major factor limiting grape production in certain districts in California, and that injury is most frequent and severe on sandy soils and on soils of low fertility. — Later, other research workers reported that although root-knot nematode injuries have been observed in every soil type, soil texture plays an important part in disease development. Damage to

Table 1

Distribution of *M. javanica* population in the infested field and damages occurred in vine rootings in corresponding situs

Distribution de la population de *M. javanica* dans la plantation affectée et dommages sur des racinés dans des sites correspondants

Plot (15 m <sup>2</sup> )	Mean root score (0—8)	Estimated no. of 2 d stage larvae/500 g of soil n	No. of spots of damaged rootings n	Total no. of damaged rootings n	Damaged rootings %	Rootstock variety
1	1.0	500	—	—	—	R 110
2	3.5	250	7	140	28	41B MG
3	4.5	300	3	35	7	R 110
4	1.0	300	1	35	7	R 110
5	8.0	80	—	—	—	R 110
6	5.0	150	4	160	32	41B MG
7	1.7	200	—	—	—	R 110
8	1.0	150	—	—	—	R 110
9	3.0	160	—	—	—	R 110
10	2.0	400	9	190	38	41 B MG
11	7.0	150	2	25	5	R 110
12	6.0	160	2	30	6	R 110
13	1.0	300	7	127	37	41 B MG
14	1.5	80	4	30	6	R 110

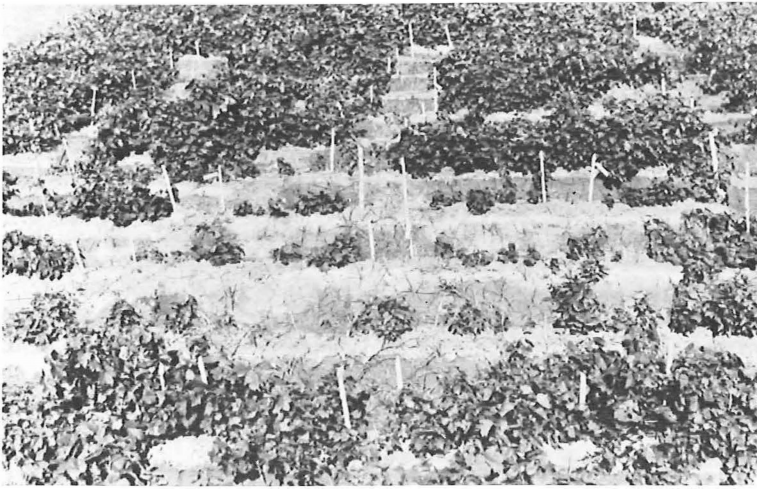


Fig. 1: A spot of damaged rootings in the plantation of the vine nursery.  
Tache de racinés endommagés dans la plantation de la pépinière.

grape production was observed to be severe on loamy sand soil, while on a nearby clay loam soil no serious damage was observed (Lownsbury and Thomason 1959).

In Europe, especially in France, the importance of the genus *Meloidogyne* was recognized twenty years ago, when severe damages occurred in vine nurseries. Ritter (1952) observed a differential susceptibility of vine rootstocks to attacks of *Meloidogyne* sp. As in the U.S.A., heavier attacks of *Meloidogyne* have been observed in vineyards and nurseries established on sandy soils (Dalmasso 1963).

In Greece, Terlidou (1962) reported the presence of a high population density of larvae of *Meloidogyne* sp. in soil samples taken from vineyards established on rather heavy soils. In this paper, attacks of *M. javanica* associated with damages occurred in the plantation of a vine nursery, are reported for the first time in Greece.

The species *M. javanica* seems to be the most frequent and widespread root-knot nematode attacking vegetables, horticultural and ornamental crops (Hirschmann *et al.* 1966, Kyrou 1968, Terlidou 1969), in various parts of the country.

### Material and Methods

In autumn 1970, it was found that the soil of an experimental tomato field was infested by *M. javanica*. In order to estimate the population density of the parasite, twenty five tomato plants were dug at random in each plot (15 m<sup>2</sup>), following harvest and each root scored 0 to 8, depending upon the degree of galling.

In the following spring (1971), an experimental vine nursery was established on the same field, in order to investigate the possibility of attack by *M. javanica* on the vine rootings. The soil type was a sandy-clay-loam of pH 8.1, and 18–20% total CO<sub>3</sub>Ca, according to Bernard's method.

Root and soil samples at a depth of about 40 cm, were taken from spots of infected rootings, when the nursery was uprooted at the end of January, 1972.

The examination of galled root samples and the determination of the species were carried out according to the s'Jacob and Bezooies procedure, as exposed in

their manual for practical work in nematology (1969), and by using the key to species of *Meloidogyne* as described by SANDERS *et al.* (1969). The average population density of the parasite was estimated by counting *Meloidogyne* larvae in soil samples (extracted according to the method of CHRISTIE and PERRY 1951).

### Results and Discussion

I. The examination of root samples from affected vine rootings revealed attacks of root-knot nematodes, which were determined to be *M. javanica* species (TREUB 1885, CHITWOOD 1949).

II. Field observations shown in Table 1 indicate (a) damages occurred on the plantation of vine nursery in spots (Fig. 1), by the destruction or the depression of the rootings during their growth, (b) average population densities of the parasitic nematode in correspondence with the damaged areas of the infested field, before and after the establishment of the nursery.

According to the above data, 41B MG (Chasselas  $\times$  *Vitis berlandieri*) is shown to be the most damaged vine rootstock in all cases (plots) in comparison to the

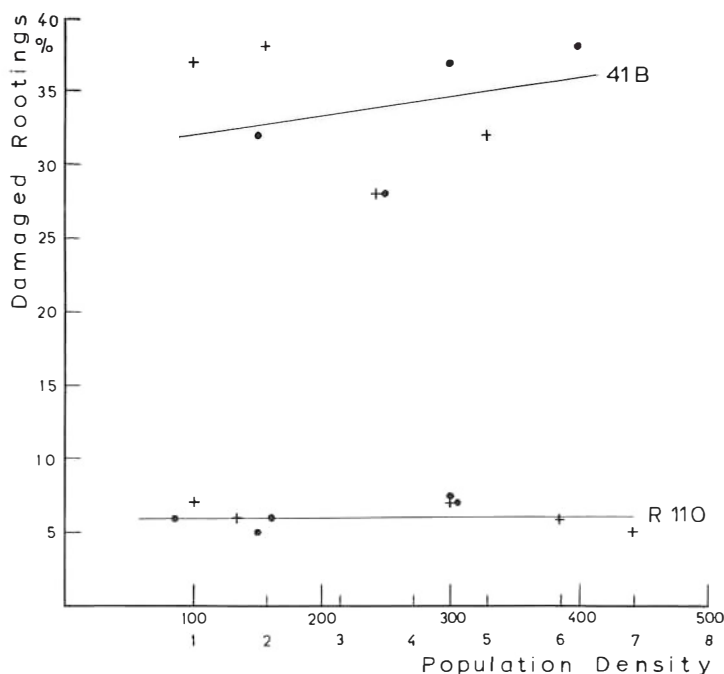


Fig. 2: Relation between density of Population and relative damage at different distribution of the species *M. javanica* in the infested field.

• = The percentage of damaged rootings in relation to the population density estimated on the degree of galling of tomato plants (mean root score, see text). + = The percentage of damaged rootings in relation to the population density estimated on the mean number of *Meloidogyne* larvae extracted from foil samples.

Relation entre la densité de la population et le dommage noté à une distribution différente de l'espèce *M. javanica* dans la plantation affectée.

• = Pourcentage de racinés endommagés par rapport à la densité de la population estimée d'après le degré de la formation de galles sur des plantes de tomates (moyenne des galles sur les racines, voir dans le texte). + = Pourcentage de racinés endommagés par rapport à la densité de la population estimée d'après le nombre moyen de larves *Meloidogyne* extraites d'échantillons du sol.

hybrid R 110 (*V. berlandieri* RESSEGUIER N° 2 × *V. rupestris* MARTIN), which in all cases of the investigation showed a good to strong degree of resistance to *M. javanica*. The results obtained are in accordance with relative literature (cited by DAVIDIS 1970).

III. Fig. 2 shows separately, in graph form, the relation between the density of population and damage occurred on rootings 41B MG and R 110. From the same graph, we could suggest that within certain limits of population densities, it could be possible to estimate the average level of damage that may occur to a vine nursery, whose rootstock's susceptibility to root-knot nematodes has been previously classified.

### Summary

In an experimental vine nursery within the grounds of the Vine Institute at Lykovrissi (Attikis), vine rootings were attacked by *Meloidogyne javanica*.

The revelation of this host-parasitic relationship between vine rootings and *M. javanica*, testified for the first time in Greece, is of a great economical importance for the country, whose ecological conditions favor the rapid development of population of nematodes of the genus *Meloidogyne*.

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