

*Agricultural Research Institute – Nicosia, Cyprus*

## THE EFFICACY OF NEMATODE RESISTANT TOMATO CULTIVARS TO *MELOIDOGYNE JAVANICA* UNDER GREENHOUSE CONDITIONS

by  
J. PHILIS

**Summary.** Studies conducted in Cyprus under greenhouse conditions during 1987-1989 using root-knot nematode resistant cultivars have shown that Carmelo and Barelli cvs were highly resistant to *Meloidogyne javanica* yielding, as an average of three years, 47.9 and 21.2 per cent significantly more than the susceptible cultivar Dombito, respectively. Nematode susceptibility of cv. Dombito, in the last year of experimentation, was high reaching 60 galls and 24,500 eggs per gram of root.

In Cyprus, root-knot nematodes (*Meloidogyne* spp.) are serious pests of many crops, mostly vegetables (Philis, 1983). Local greenhouse tomato production is about 2,400 tons with an annual value of \$0.4 million (Anon. 1987). Because root-knot nematodes are a problem in greenhouse-grown tomatoes, the most widely used method for controlling them is to apply soil fumigants prior to planting. However, soil fumigants must be used only by trained personnel; they are costly and if used incorrectly are hazardous to humans and the environment. Nematode-resistant cultivars offer an economically attractive alternative to the widely used soil fumigants for the control of root-knot nematodes. In this study, the nematode resistance and yield of two commercial cultivars was compared with the widely used local cv. Dombito which is susceptible to root-knot nematodes.

### Materials and methods

The experiment was conducted for three seasons from 1987 to 1989 in an unheated greenhouse in the Paphos region. The greenhouse soil was infested with *Meloidogyne javanica* (Treub.) Chitw. Nematode-free tomato seedlings of cvs Carmelo, Barelli and Dombito, 10-15 cm in height, were transplanted in the same row each year on 12 November 1986, 12 December 1987 and 13 December 1988. At the end of each growing season plants were dug with a fork at 224, 226 and 203 days after planting for the first, second and third year, respectively. Seedlings were planted each year on 30x75 cm spacing in and between rows, respectively. Eight seedlings of each cultivar were transplanted in each row and replicated three times in a

randomized complete block design. There were two rows for each treatment. As fruit reached maturity they were harvested, weighed and counted. Resistance evaluation during the growing season was examined monthly by random root sampling of two plants from each row and counting of galls after root washing. Eggs were extracted by NaOCl (Hussey and Barker, 1973) and counted. Fresh root weights were recorded after washing and drying roots. Soil temperatures were recorded continuously at 15 cm depth, using a distant point soil thermograph.

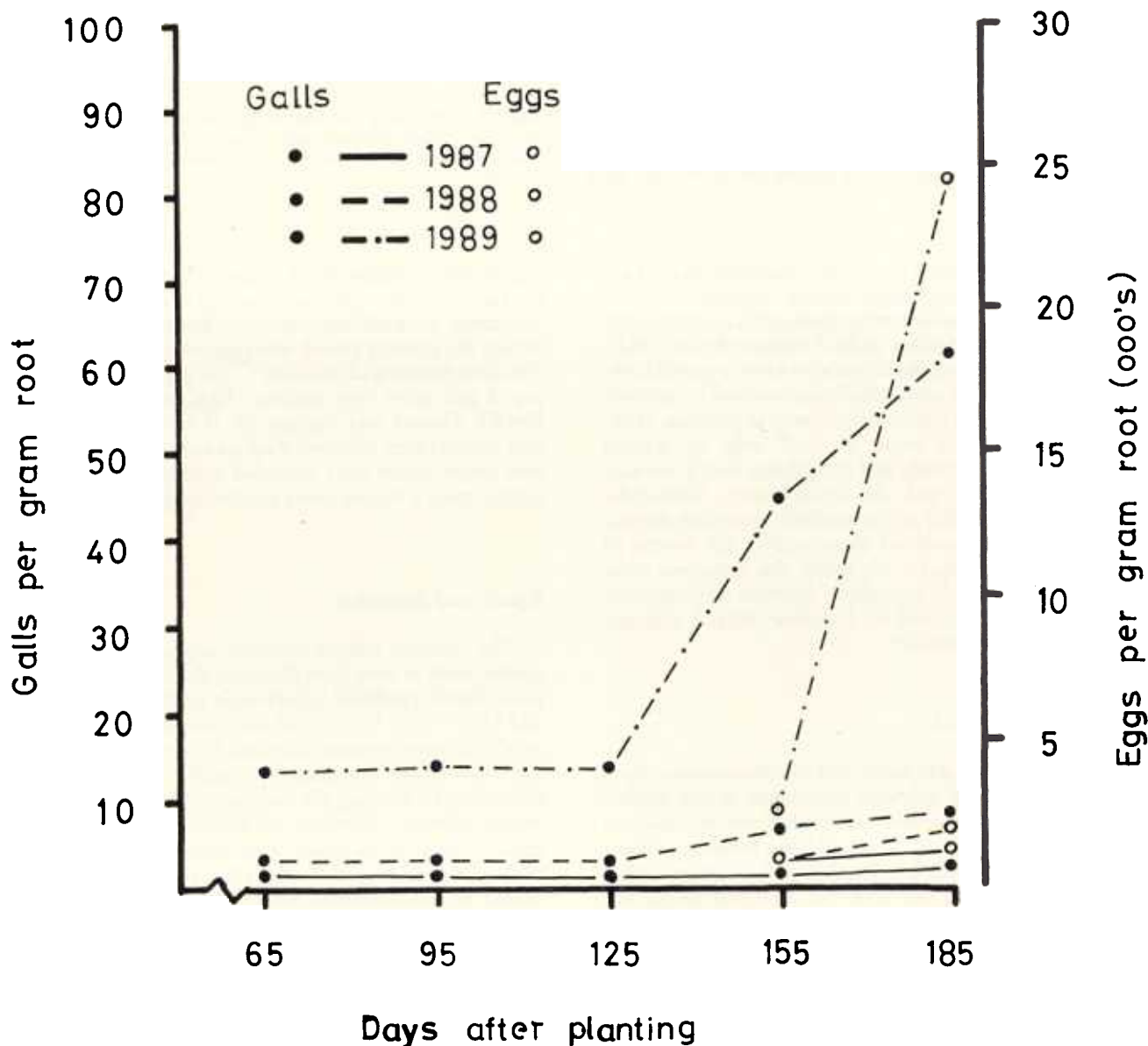
### Results and discussion

The resistant cultivar Carmelo produced significantly greater yield of fruit than Dombito did in 1988 and 1989 while Barelli produced significantly greater yield in 1988 and 1989 (Table I). In 1987 fruit weight was not significantly different between cultivars. However, as nematode infestation levels increased on Dombito in the following years (Fig. 1), yields of the resistant cultivars were not adversely affected. Dombito produced 48.9 and 58.2 per cent less fruit in the second and third years of the experiment, respectively, than the first year (Table I), this caused by the increased nematode infestation in those years. Overall, Carmelo and Barelli produced 50.5 and 20.2 per cent greater yields than Dombito (Table I). Also, Carmelo produced significantly larger fruit than the other cultivars while Barelli, although nematode resistant, produced the smallest fruits. Root galling for all years appeared on the sixty fifth day from planting (Fig. 1) while egg production commenced five months after planting. No

TABLE I - Yield of three tomato cultivars in a nematode-infested greenhouse, for three consecutive years (1987-1989).

	Yield								
	kg/plant			Fruits/plant			Average fr. weight (g)		
	1987	1988	1989	1987	1988	1989	1987	1988	1989
Carmelo	4.7 a	3.6 a	4.2 a	41 a	29 a	41 a	115 a	123 a	104 a
Barelli	4.1 a	2.7 b	3.2 b	47 ab	36 b	48 b	88 b	75 b	68 b
Dombito	4.3 a	2.2 c	1.8 c	32 b	21 c	20 c	136 c	107 ab	90 b

Numbers in a column followed by the same letter are not significantly different at the 5% level (Duncan's multiple range test).



Number of galls and eggs on Dombito caused by *Meloidogyne javanica* under greenhouse conditions.

root-knot nematode infestation was detected on the resistant cultivars during the experimental years.

High amounts of heat units, mainly during the last 3-4 months of the growing season, substantially increased nematode infestation. In the first two months after planting, soil temperatures ranged only from 12° to 15° C this being much lower than the optimum temperature for nematode development. The overall range of soil temperature

throughout the growing seasons ranged between 12° and 27° C, this being within limits for normal nematode development and reproduction (Fig. 2).

Thanks are due to Messrs. A. Petrides and Chr. Chrysostomou for their technical assistance and Messrs. S. Stavrinides & Co. Ltd., Nicosia, Cyprus, for supplying seed of the resistant tomato cultivars.

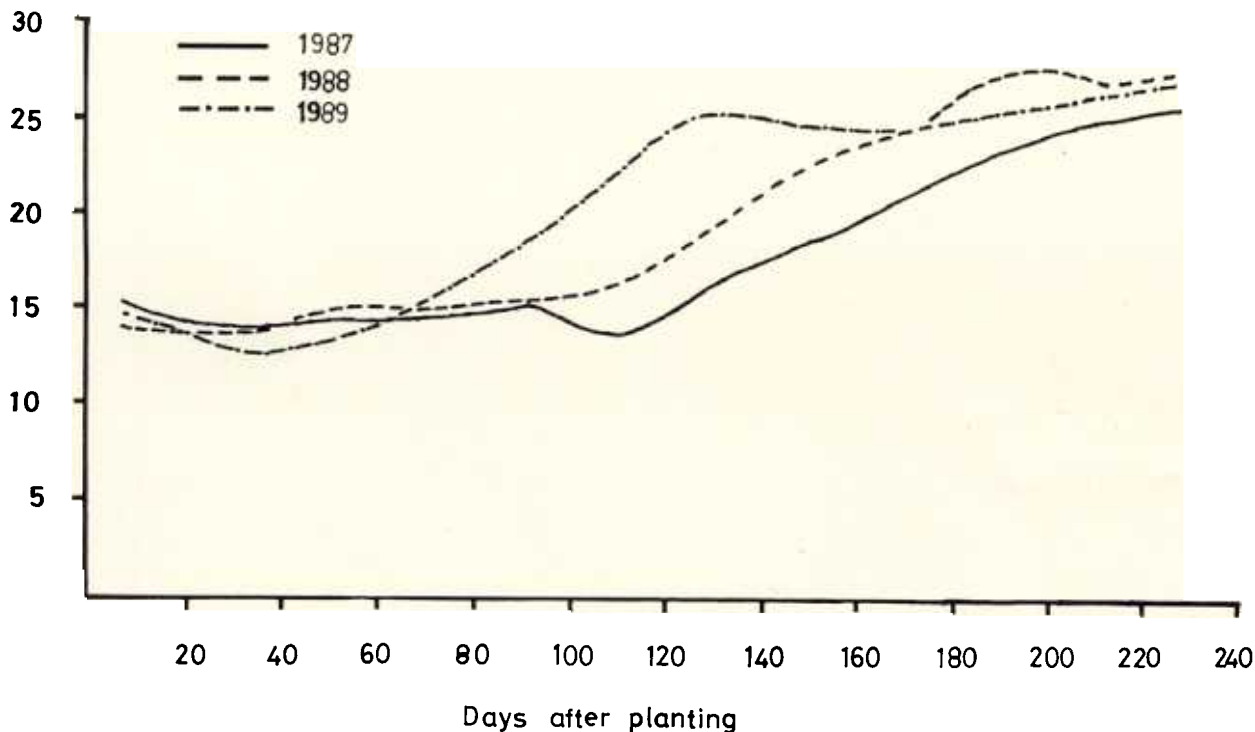


Fig. 2 - Soil temperatures throughout tomato growing season in the greenhouse.

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