

Short Scientific Report

EFFECT OF ROOT KNOT NEMATODE, *MELOIDOGYNE INCOGNITA* ON THE GROWTH OF TURMERIC

The root knot nematode, *Meloidogyne incognita* is an important pest of turmeric and has a wide distribution in Kerala State (Nadakai and Thomas, 1964; Sundararaju *et al*, 1979; Venkitesan and Charles, 1980). Though turmeric has been reported as host of *Meloidogyne incognita* there is hardly any information on the effect of this nematode on turmeric growth and yield. To fill up this gap, the present study was undertaken.

Turmeric rhizomes of variety 11316 Gorakpur, weighing 8g each with one sound eye bud were sown in 60 clay pots (18 × 18 cm) containing methyl bromide fumigated (1 lb/100 cu.ft.) sandy loam soil. At three leaf stage, 30 plants of uniform growth were selected. The nematode inoculum was collected from nematode infested black pepper roots and the seedlings were inoculated with graded inoculum levels (10, 100, 1000, 10,000 and 100,000) in June 1981. The uninoculated plants were kept as control. Each treatment was replicated five times. The pots were arranged in a randomised manner in a greenhouse with a temperature range of 27-34°C and watered daily with boiled and cooled water. The plants were uprooted after six months and observations were recorded on plant growth, yield, root knot index and nematode population (Tables I and II).

The inoculated plants exhibited stunted growth, marginal necrosis, drying of leaf tip, and reduction in number of tillers

compared to control plants over a period of six months. Highly significant reduction in shoot, root and rhizome weights were observed at inoculum level of 1000 larvae (Table I). An initial inoculum level of 100,000 nematodes per plant was found to cause 33.6, 29.1, 34.5, 46.5, 77.3, 89.0, and 76.7 per cent reduction over control whereas with 10 larvae it was only 10.3, 14.3, 4.8, 13.9, 24.4, 52.4 and 42.0 per cent reduction with respect to shoot length, length of lamina, maximum width of lamina, number of leaves, shoot weight, root weight and rhizome weight. A reduction of 64.2% and 76.7% in rhizome weight was noticed in plants inoculated with 10,000 and 100,000 nematodes per plant respectively. At this stage the plants started exhibiting signs of death due to severe galling and rotting of rhizomes and roots.

The root systems of all inoculated plants showed heavy root galling. An increase in initial inoculum from 10 to 100,000 larvae resulted in corresponding increase in root galling index (Table II). The total nematode population build up was not statistically significant in the rhizome. However, highly significant population build up was noticed in root and soil. The highest rate of multiplication (546.6 times) was observed in treatments with the inoculum level of 10 larvae and the lowest rate of 2.8 times with the inoculum level of 100,000 larvae. These results were in agreement with

Table I. *Effect of different inoculum levels of M. incognita on the growth of turmeric seedlings under greenhouse conditions (mean of 5 replications)*

Inoculum levels	Shoot length (cm)	Length of lamina (cm)	Maximum width of lamina (cm)	No. of leaves	Shoot weight (g)	Root weight (g)	Rhizome weight (g)
0	66.30	36.80	7.14	8.60	23.80	16.40	35.20
10	59.50 (10.3)	5.52 (14.3)	6.80 (4.8)	7.40 (13.9)	18.00 (24.4)	7.80 (52.4)	20.40 (42.0)
100	65.50 (1.2)	31.68 (13.9)	7.16 (-0.2)	6.00 (30.2)	15.80 (33.6)	3.92 (76.1)	18.20 (48.3)
1000	53.90 (18.7)	27.60 (25.0)	5.86 (17.9)	6.20 (27.9)	9.60 (59.7)	2.60 (84.1)	18.20 (48.3)
10000	47.64 (28.1)	25.72 (30.1)	4.74 (33.6)	5.00 (41.9)	8.60 (63.9)	2.34 (85.7)	12.60 (64.2)
100000	44.00 (33.6)	26.10 (29.1)	4.68 (34.5)	4.60 (46.5)	5.40 (77.3)	1.80 (89.0)	8.20 (76.7)
General Mean	56.14	29.9*	6.06	6.31	13.53	5.81	18.80
C.V. %	17.14	12.00	12.06	0.98	31.60	64.79	29.86
C.D.	12.69*	4.73*	0.97**	0.74*	5.64**	4.97**	7.41**

Figures in parentheses are the percentage reduction over control

Table II. *Effect of different inoculum levels on host infestation and population build up M. incognita on turmeric seedlings under greenhouse conditions (Mean of 5 replications)*

Inoculum levels	Root knot index*	Total Nematode population			Multiplication factor
		Rhizome	Soil	Root	
0	0	0	0	0	0
10	1.2	1745	1463	2259	546.6
100	2.4	8862	2350	4553	155.6
1000	3.2	9487	5205	14290	28.9
10000	4.0	12547	6502	81740	10.1
100000	4.0	53567	11029	216042	2.8
Gen. Mean	2.96	17201	3309	63779	-
C.V. %	28.57	113	31.01	65.46	-
C.D.	1.13*	NS	2207.95**	55976.71**	-

*Gall index rating: 0 = no galling, 1 = mild, 2 = moderate, 3 = severe and 4 = very severe

that of Koshy *et al.* (1979) on black pepper and Sudha Sukumaran and Sundararaju (1985) on ginger.

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