

**Pathogenicity of *Meloidogyne incognita* on ginger (*Zingiber officinale* ROSC)**

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The root-knot nematode, *Meloidogyne incognita*, is an important nematode pest of ginger in Kerala and has a wide distribution in the state causing up to 46.4 per cent loss in yield (Charles, 1978). Though ginger has been reported as a host of *M. incognita*, its pathogenic effect has not been studied, so far. This aspect was, therefore, investigated.

Methyl bromide fumigated (1 lb/100 cu ft) field sandy loam soil was filled in 18 × 18 cm clay pots (3000 ml soil/pot) and planted with ginger rhizomes, variety 'Maran', in April, 1981. At 3 leaf stage,

25 plants of uniform growth were selected. The nematode inoculum was obtained from infested pepper roots and the seedlings were inoculated (June, 1981) with graded inoculum levels (0, 10, 100, 1000 and 10,000), with 5 replications at each level. The pots were arranged in a randomised manner in a green house (27-34°C) and watered daily with boiled and cooled water.

After 6 months, plants were depotted and washed thoroughly for root-knot indexing. Plant growth characters were also recorded. Nematode population

TABLE 1: Effect of different inoculum levels of *M. incognita* on the growth of ginger seedlings and nematode multiplication (Mean of 5 replications)

Inoculum levels	Shoot length (cm)	Shoot weight (g)	Root weight (g)	Rhizome weight (g)	Gall Index <sup>a</sup>	Total nematode population <sup>b</sup>		
						Rhizome	Soil	Root
0	61.82	21.00	8.60	26.20	0	0	0	0
10	54.07 (12.5)	16.20 (22.9)	6.00 (30.6)	18.00 (31.3)	2.0	3.3	3.2	3.4
100	43.42 (23.8)	5.40 (78.3)	2.65 (69.1)	12.60 (51.9)	2.4	3.9	3.4	3.5
1000	35.33 (42.9)	8.30 (60.5)	2.30 (72.4)	10.40 (60.4)	3.0	4.0	3.6	4.1
10000	27.63 (55.3)	4.00 (80.9)	1.51 (83.9)	6.80 (74.1)	4.2	3.9	3.8	4.9
Gen. Mean	44.45	11.08	4.21	14.80	2.9	3.8	3.5	4.0
C.V. (%)	10.38	48.30	42.58	23.50	27.3	6.8	4.1	6.2
CD (P=0.05)	6.09	7.06	2.37	1.06	1.1	0.4	0.2	0.3

a = gall index rating: 0 = no galling; 1 = mild; 2 = moderate; 3 = severe; 4 = very severe; 5 = advanced

b = Transformed values: log 10

Figures in parentheses are per cent reduction over control.

from root (1 g) and soil (250 ml) from each pot was estimated.

The inoculated plants exhibited stunted growth with reduced vigour compared to control plants over a period of 6 months. The leaves of such inoculated plants were pale yellow and their tips started drying 20 to 25 days after inoculation and after 4 months most of the leaves dried leaving only one or two young leaves with some tillers. Hence, number of leaves and tillers could not be recorded at the end of the experiment. The root systems of all inoculated plants showed heavy galling. The parasitic nature of the nematode was highly significant as indicated by shoot length, shoot, root and rhizome weights (Table I). In general, the data revealed that with every increase in nematode inoculum there was a corresponding decrease in plant growth. An initial inoculum level of 10,000 larvae caused 55.3, 80.9, 83.9 and 74.1 per cent reduction over control, whereas with 10 larvae it was on 12.5, 22.9, 30.6, and 31.3 per cent reduction with respect to shoot length, shoot weight, root weight and rhizome weight over a period 6 months. A reduction of 74.1 per cent of rhizome weight was recorded at an initial inoculum level of 10,000 nematodes per plant

over a period of 6 months. At this stage, the plants started exhibiting signs of death due to severe galling and rotting of rhizomes and roots.

The root-knot index also increased with an increase in inoculum levels. The total population build up was not proportional in the rhizome whereas in soil and root a steady increase of nematode population was noticed. However, the multiplication rate was maximum at 10 nematodes level in all the three cases.

It is apparent, therefore, that root-knot nematode is highly pathogenic to ginger and can cause significant growth reduction at an initial population of one infective individual per 30 g of soil.

Our grateful thanks are due to Dr. P.K. Koshy, Head, Division of Nematology, CPCRI, Regional Station, Kayangulam for providing necessary facilities and help during the present studies and to Mr. K. Vijayakumar, Scientist (Statistics), CPCRI, Kasaragod for the analysis of the data.

#### REFERENCE

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