Integrated management of root knot nematode in ginger (*Zingiber officinale* Rosc.)

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ABSTRAT

Pre-planting application of neem cake(1t/ha) followed by post-planting application of carbofuran(1 kg ai/ha) 45 days after planting gave the best result in terms of suppression of root knot nematode population, disease intensity and increased yield of ginger (*Zingiber officinale* Rosc.) closely followed by application of carbofuran first followed with neem cake.

Key words: ginger, management, root knot nematode, *Zingiber officinale*

Root knot nematode *Meloidogyne incognita* is responsible for direct yield losses of 46 per cent in ginger (*Zingiber officinale* Rosc.) under endemic situations in Orissa. The losses could be still more because of its role as an incitant/ aggravator of bacterial wilt (Samuel & Mathews 1983) and also soft rot of ginger (Langewar & Shukla 1985). In view of the seriousness of the problem, an integrated management trial was conducted in a root knot sick plot against the nematode and the results are reported here.

The trial consisting of seven treatments including control was laid out in a Randomized Block Design with 2m × 2 m sub plots in four replications in a root knot sick plot in 1991, with an initial nematode load of 227.6 juveniles/250 ml soil 45 days after planting (DAP).

The treatments were as follows:

T_1 Neem cake @ 2.5 t/ha before planting

T_2 Carbofuran @ 1 kg ai/ha before planting

T_3 Neem cake @ 1 t/ha before planting and carbofuran @ 1 kg ai/ha at 45 DAP

T_4 Carbofuran @ 1 kg ai/ha before planting and neem cake @ 1 t/ha at 45 DAP

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T_5 Neem cake @ 1 t/ha at 45 DAP

T_6 Carbofuran @ 1 kg ai/ha at 45 DAP

T_7 Untreated control

The variety used was 'Suprava' which is susceptible to root knot nematode. Nematode population in soil and root were estimated at 45 DAP (initial) and at harvest. Nematode populations in soil were estimated following Cobb's sieving and decantation technique (Cobb 1918) and root population was determined following modified Baermann funnel technique (Christie & Perry 1951). While soil populations were analysed following log transformation, root populations were analysed after v/n transformations. Root gall index in the 1-5 scale and yield per plot were recorded at harvest. Yield per hectare and per cent yield increase over control were calculated.

All the treatments except T_5 (neem cake @ 1t/ha alone at 45 DAP) were significantly superior over control in reducing the gall index (G I) values, the lowest GI value being 1.8 in T_3 (neem cake @ 1t/ha before planting and carbofuran @ 1 kg ai/ha at 45 DAP) which is significantly superior over T_1 (GI 2.60), T_6 (G I 2.65), T_4 (G I 2.75) and T_2 (GI 2.90) as against GI 3.85 in control (Table 1). T_3 also gave the highest yield of 77.75 q/ha showing an increase of 119 per cent over control (35.5 q/ha). Yield of T_3 was at par with T_4 (68.75 q/ha) and T_1 (59.8q/ha). However yields in T_2, T_5 and T_6 were at par with control. Thus in terms of reduction in disease intensity, nematode population and increased yield, application of neem cake @ 1t/ha before planting followed by soil treatment of carbofuran @ 1 kg ai/ha at 45 DAP proved to be the best. Parihar & Yadav (1986) observed that two applications of nematicides first, aldicarb @ 2kg ai/ha at planting followed by a post-planting application of either aldicarb @ 1.5 kg a i/ha or carbofuran @ 2 kg ai/ha were necessary for effective suppression of root knot nematode population and its infestation in ginger. Stirling (1989) also observed that neither simple pre-planting application of nematicide (Phenamiphos) nor heavy dose of any organic amendments alone was effective against *M. incognita* in ginger. The best result was obtained when pre-planting application of organic amendment was supplemented with a post planting application of a nematicide (Phenamiphos). The present results are in line with the aforesaid findings.

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Table 1. Integrated management of *Meloidogyne incognita* in ginger

Treatment	Nematode popn./ 250 cc soil at 45 DAP (log)	Nematode popn/10 g root at 45 DAP (/n)	Nematode popn/ 250cc soil at harvest (log)	Nematode popn/ 10g root at harvest (/n)	Gall index at harvest (1-5scale)	Final plant stand at harvest	Yield/ plot (2×2m) (kg)	Projected yield (q/ha)	% increase in yield of over control
T_1	168.50 (2.23)	8.25 (2.85)	193.00 (2.28)	12.75 (3.53)	2.60	40.00	2.38	59.50	67.70
T_2	109.25 (2.04)	10.50 (3.23)	207.50 (2.31)	18.50 (4.22)	2.90	38.25	1.98	49.50	39.43
T_3	193.75 (2.29)	10.75 (3.25)	131.75 (2.11)	10.50 (3.13)	1.80	40.00	3.11	77.75	119.01
T_4	100.75 (2.00)	9.50 (3.04)	182.00 (2.26)	15.50 (3.87)	2.75	39.00	2.75	68.75	93.66
T_5	257.75 (2.41)	13.00 (3.65)	162.50 (2.21)	14.50 (3.73)	3.80	37.00	1.50	37.50	5.63
T_6	252.75 (2.40)	13.50 (3.65)	212.25 (2.32)	13.25 (3.60)	2.65	39.50	1.62	40.50	14.08
T_7	251.50 (2.40)	13.00 (3.55)	274.25 (2.44)	20.50 (4.46)	3.85	36.75	1.42	35.50	–
CD (0.05)	0.08	NS	0.09	NS	0.21	2.12	0.90	–	–

Initial nematode population/250cc soil = 227.6

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