

Yield losses in ginger (*Zingiber officinale* Rosc.) and turmeric (*Curcuma longa* L.) due to root knot nematode (*Meloidogyne incognita*)

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ABSTRACT

Soil application of carbofuran @ 3 kg a i /ha 3 weeks after planting resulted in avoidable yield losses to the extent of 33.61 per cent in turmeric (*Curcuma longa* L.) and 26.30 per cent in ginger (*Zingiber officinale* Rosc.) due to *Meloidogyne incognita*. Gall index values were correspondingly high in control plots compared to treated ones in both ginger and turmeric.

Key words: ginger, root knot rematode, turmeric, yield loss.

Root knot nematode *Meloidogyne incognita* is associated with almost all the cultivated spice crops in Orissa resulting in severe crop losses particularly in ginger and turmeric. Hence, two separate trials were conducted in 1991 and 1992 in root knot sick plots to asses the extent of yield losses in ginger and turmeric and the results are presented here.

In 1991, a root knot sick field was selected wherein, the nematode load at planting was around 180 juveniles per 250 ml of soil. Sub plots of 1.8 m × 1.0m size were laid out for 2 treatments in 5 replications in paired plot design for both turmeric and ginger with 16

plants/plot. Treatments consisted of soil application of carbofuran @ 3 kg ai/ha, 3 weeks after planting and untreated check. The varieties used were 'Roma' (turmeric) and 'Suprava' (ginger), both susceptible to root knot nematode. Initial and final nematode counts per 250 ml soil were recorded following Cobb's sieving and decantation method (Cobb 1918). Populations in 10 g roots were also recorded at harvest following modified Baermann technique (Christie & Perry 1951). Gall index values in the 1-5 scale and average yield per plot were recorded from which yield and per cent yield losses per hectare were extrapolated. The trials were repeated in

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Table 1. Yield losses in turmeric (cv. Roma) due to *Meloidogyne incognita*

Treatment	Final gall index (1-5 scale)		% decrease in gall index		Final nematode pop/250 cc soil		Final nematode pop/10 g root		Yield/plot (1.8 × 1.0m) (kg)		Calculated yield (q/ha)		% yield loss	
	1991	1992	1991	1992	1991	1992	1991	1992	1991	1992	1991	1992	1991	1992
Carbofuran @ 3 kg a i/ha	2.68	2.64	46.55	45.45	186.4	212.2	8.96	10.96	1.39	1.76	77.22	97.77	-	-
Untreated control	4.84	4.84	-	-	268.6	283.4	17.92	21.12	0.89	1.21	49.44	67.22	35.97	31.25
Calculated 't' value	11.13	24.59	-	-	3.37	3.81	4.79	2.96	4.71	3.81	-	-	-	-

Table 't' value = 2.77

Initial nematode population/250 cc soil = 179.4 (1991) & 190.8 (1992)

Table 2. Yield losses in ginger (cv. Suprava) due to *Meloidogyne incognita*

Treatment	Final gall index (1-5 scale)		% decrease in gall index		Final nematode pop/250 cc soil		Final nematode pop/10 g root		Yield/plot (1.8 × 1.0m) (kg)		Calculated yield (q/ha)		% yield loss	
	1991	1992	1991	1992	1991	1992	1991	1992	1991	1992	1991	1992	1991	1992
Carbofuran @ 3 kg a i/ha	2.48	2.52	45.61	40.56	191.4	194.6	9.60	11.48	1.71	1.43	95.00	79.44	-	-
Untreated control	4.56	4.24	-	-	274.8	277.0	19.36	22.84	1.30	1.02	72.22	56.66	23.97	28.67
Calculated 't' value	10.61	9.27	-	-	4.15	4.10	3.91	3.50	2.85	2.92	-	-	-	-

Table 't' value = 2.77

Initial nematode population/250 cc soil = 178.4 (1991) & 167.6 (1992)

contiguous new sites in 1992 for both ginger the turmeric.

The decrease in gall index values in carbofuran treated plots was 46.55 per cent in 1991 and 45.45 per cent in 1992 (average 46.05 per cent) in turmeric (Table 1) and in ginger they were 45.61 per cent in 1991 and 40.56 per cent in 1992 (average 43.08) (Table 2).

The loss in yield due to the nematode was 35.97 per cent in 1991 and 31.25 per cent in 1992 (average 33.61 per cent) in turmeric and in ginger the yield loss due to the nematode was 23.97 per cent in 1991 and 28.67 per cent in 1992 (average 26.32 per cent). Significant yield increase in ginger following use of nematicide, organic amendments or both against *M. incognita* were also observed by Milne (1979), Parihar & Yadav (1986) and Stirling (1989) which together with the present finding emphasizes the need for proper management strategies against root knot nematode in ginger and turmeric.

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