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Research Paper

## SCREENING OF BELL PEPPER CULTIVARS AGAINST ROOT-KNOT NEMATODE *MELOIDOGYNE INCOGNITA* [(KOFOID AND WHITE) CHITWOOD]

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Root-knot nematode (*Meloidogyne incognita*) is the major pest on bell pepper which causes a yield loss upto 15%. Among the non chemical methods available to control them; the use of resistant cultivars is considered one of the most effective and environmentally safe alternatives. An investigation was carried out to assess the tolerance level of five available cultivars viz., Indam Mamatha, Chocolate Wonder, Indra, Indam Supergold and California Wonder against *M. incognita*. Among the five bell pepper cultivars screened none of them was found to be resistant to root-knot nematode. However, the least number of galls were recorded in the roots of Indam Mamatha with least root-knot index followed by Chocolate Wonder. The cultivar, Indra was highly susceptible to *M. incognita*.

**Keywords:** Root-knot nematodes, resistant cultivars, bell pepper, galls.

### INTRODUCTION

Root-knot nematode (*Meloidogyne incognita*) is an important pest of several crops worldwide. Among the non chemical methods available to control them the use of resistant cultivars is considered one of the most effective and environmentally safe alternatives. Although several resistant cultivars are commercially available, the loss of their effectiveness forces a continuous search for new resistant genes. The durability of the resistance will depend on its agronomic management and on the virulence of the nematode populations in the different crop areas (Piendra Buena *et al.*, 2004). However,

none of the bell pepper cultivars available to the commercial growers and home gardeners exhibited an adequate level of resistance to *M. incognita*. In this context, the present investigation was carried out to assess the tolerance level of the bell pepper cultivar Indra which is commercially growing in and around Bengaluru along with other four available cultivars viz., Indam Mamatha, Chocolate Wonder, Indam Supergold and California Wonder against root-knot nematode, *M. incognita*.

### MATERIALS AND METHODS

Five bell pepper cultivars were screened for their

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reaction to *Meloidogyne incognita* in sick plot maintained by AICRP (Nematodes), Department of Plant Pathology, University of Agricultural Sciences, GKVK, Bengaluru-65. A field trial was conducted at sick plot, to assess the level of resistance or susceptibility of the prevailing cultivars to the root-knot nematode. A total of five cultivars viz., Indam Mamatha, Chocolate Wonder, Indra, Indam Super Gold and California Wonder were screened against the root-knot nematode.

The plot was thoroughly ploughed to a fine tilth, harrowed and leveled. All the normal package of practices like FYM and fertilizers were applied to the plot. The five bell pepper cultivars seedlings were transplanted in a plot of 2 x 2 m<sup>2</sup> size separately with two replication. All the other normal package of practices like irrigation, fertilizer application and weeding were done uniformly to all the plots. 60 days after sowing and at harvest the plants were removed carefully from field, primary and secondary roots were cleared of soil, washed and the observations on number of galls and root-knot index (Anon, 1993) were recorded and categorized in to different levels of tolerance/susceptibility based on disease reaction.

## RESULTS AND DISCUSSION

The results in Table 2 revealed that, none of the cultivar showed resistant reaction. However, the cultivar Indam Mamatha was recorded least number of galls (20.00 galls/plant at sixty DAP (Table 1) and 53.33 galls/plant at harvest) root-knot indices (3.0 and 4.0) at sixty days after planting and at harvest respectively which indicating moderately resistant reaction at 60 DAP and susceptibility at harvest. Similarly, Pandey and Trivedi (1990) reported chilli cultivar Pusa

jwala as a resistant, Mandore local 1 and 2 as moderately resistant. The cultivar Chocolate Wonder also follows the same trend with respect to disease reaction with 27.67 numbers of galls per plant at 60 days after planting and 72.67 numbers of galls per plant at harvest.

The cultivar Indra which is commercially growing in and around Bengaluru was highly susceptible to *Meloidogyne incognita* which was recorded highest number of galls (43.67 galls/plant at 60 days DAP and 127.67galls/plant at harvest) with root-knot indices (4.0 and 5.0 at 60 days after planting and 4.0 at harvest respectively) indicating susceptible at 60 DAP and highly susceptible at harvest. Similarly, reports of the workers viz., Khan (1990), Vito *et al.* (1992), Adam *et al.*, (2008) have indicated the non availability of resistant cultivars. However few reports on screening of bell pepper revealed the availability of resistant sources against *Meloidogyne incognita*. Fery (1998) identified two root-knot nematode resistant cultivars viz., Carolina wonder and Charleston belle.

Although bell pepper cultivars has been selected by farmers based on agronomical characteristics such as crop yield or fruit quality, the susceptibility of plants in present study suggested that these criteria did not favor selection for root-knot nematode resistance. Taking into account the obtained results and high local interests of farmers in selecting cultivars, further studies should be focused on plant selection on resistance to root-knot nematode in order to enhance the productivity of bell pepper in nematode infection areas. In the present study none of the cultivar show resistant reaction. However, Indam mamatha showed moderately resistant reaction at the beginning of crop growth indicates possible selection of plants against root-

**Table 1: Screening of Bell Pepper Cultivars to *M. incognita* Under Field Condition**

Cultivars	At 60 DAP		Disease Reaction
	Number of Galls/Plant	Root Knot Index	
Indam mamatha	20.00	3.0	Susceptible
Chocolate wonder	27.67	3.0	Susceptible
Indra	43.67	4.0	Highly Susceptible
Indam super gold	30.33	3.3	Susceptible
California wonder	33.00	3.3	Susceptible
S. Em ±	0.82		
CD at 5%	2.50		

Note: INP: 340/200 cc of soil; DAP: Days after planting.

**Table 2: Screening of Bell Pepper Cultivars to *M. incognita* Under Field Condition**

Cultivars	At Harvest		Disease Reaction
	Number of Galls/Plant	Root Knot Index	
Indam mamatha	53.33	4.0	Susceptible
Chocolate wonder	72.67	4.0	Susceptible
Indra	127.67	5.0	Highly Susceptible
Indam super gold	73.67	4.0	Susceptible
California wonder	97.67	4.0	Susceptible
S. Em ±	1.34		
C.D. at 5%	4.06		

Note: INP: 340/200 cc of soil; DAP: Days after planting.

knot nematode and we can also manage nematode population at later stage of crop growth by integrating other control measures such as chemicals and bioagents.

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## REFERENCES

1. Adam MA, Ehwaeti ME and El Maleh AA (2008), "Susceptibility of Some Tomato, Eggplant And Pepper Cultivars to Infection With two Species of Root-knot Nematodes", *Arab J. Plant Protect.*, Vol. 26, No. 2, pp. 163-166.
2. Anonymous (1993), "Consolidated Report On Rabi Pulses Plant Nematology", *All India Co-ordinated Pulses Improvement Project*, p. 18, Kanpur.

3. Fery RI and Thesis JA (1998), "Southern Root-knot Nematode Resistant To *Capsicum Chinens* Germplasm Lines", *Hort. Sci.*, Vol. 33, No. 4, pp. 760-776.
4. Pandey R and Trivedi P C (1990), "Response of Chilli Cultivars to *Meloidogyne Incognita* and Its Effect on Morphometrics of Female", *Nematol. Medit.*, Vol. 18, pp. 219-220.
5. Piendra Buena A, Lopez-perez J A, Diez- Rojo M A, Escur M, Robertson L, De Leon L and Bello (2004), "Manejo Ecologico De Nematodes For- Madores De Nodules Del Genero *Meloidogyne* Enzonas Horticolas De Uruguay", In Seae (Ed.). pp. 549-562.
6. Vito M D, Saccardo F, Errico A, Zacheo G and Catalano F (1992), "Genetic Of Resistance To Root-knot Nematodes (*Meloidogyne* Spp.)", in *Capsicum Chacoense, C. Chinense* and *C. Frutescens. Capsicum Newsletter*. (Special Issue), pp. 205-209.



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