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Management of *Meloidogyne incognita* in Mungbean by Seed Soaking in Different Chemicals under Pot Condition

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A B S T R A C T

A pot experiment conducted to study the efficacy of different chemicals for the management of *Meloidogyne incognita* indicated that seed soaking treatment of Emamectin benzoate @ 1.0 g/lit and Carbosulfan @ 2.0 ml/lit for 6 hours proved to be effective in improving the plant growth parameters and reducing root-knot disease and final nematode population.

Introduction

Mungbean (*Vigna radiata* (L) R. Wilczek) belongs to family Leguminosae and sub family Papilionaceae. It is known by many common names *viz.*, mung, moong, mungo, goldengram, chickasawpea, oreganpea *etc*. In India, the name green gram is more commonly used than mungbean (Chatterjee and Randhawa, 1952). Gupta and Verma (1990) estimated avoidable losses in mungbean under field conditions due to *M. javanica* ranged from 42.1 to 93.4%. The yield loss of 18 to 65 and 23 to 49% due to *M. incognita* and *M. javanica* respectively in mung bean has been reported by Sharma *et al.*, (2000). Crop loss due to *M. incognita* in green gram has been reported as 8.90% (Khan *et al.*, 2010). *M. incognita*, *M. javanica*, *Heterodera cajani* and *Rotylenchulus reniformis* are the nematodes attacking black gram and green gram inducing 8.90% yield loss with 162 million as a monitory loss (Jain *et al.*, 2007).

Materials and Methods

Earthen pots of 15 cm diameter were washed with water and then disinfested with 4% formaldehyde (Formalin 40 EC solution). After drying, pots were filled with nematode infested soil having 1 J_2/g soil (1.5 kg/pot). Thirteen treatments including one check (Table 2) were employed in Completely Randomized Design (CRD) with four repetitions. Seeds of mungbean variety Gujarat anand mung 5 were soaked in the solution of chemicals for 6 hours. Then seeds

were dried under shade and three seeds seeded in each pot. Upon germination, plants were thinned down to one/pot. Watering was done as and when required. Plant protection measures were adopted as per the recommendation in vogue. After 45 days of sowing, the experiment was discontinued by removing the plants from the pots and roots were washed gently under running tap water. Observations on plant height, fresh shoot and root weights were recorded. Roots were cut in to 2-3 cm length and 3 g roots were stained in 0.05% acid fuchsin in lactophenol. Then roots were washed with tap water to remove excess stain and kept overnight in lactophenol, then roots were examined for nematode population.

Results and Discussion

In order to assay the effect of chemicals for the management of *Meloidogyne incognita* in mungbean, seed were soaked in Acetamiprid @ 1.0 g/lit. (T_1), Carbosulfan @ 2.0 ml/lit. (T_2), Emamectin benzoate @ 1.0 g/lit. (T_3), Fipronil @ 1.0 ml/lit. (T_4), Imidaclopride @ 2.0 ml/lit. (T_5), Spinosad @ 1.0 ml/lit. (T_6), Thiamethxam @ 1.0 g/lit. (T_7), Flonicamid @ 1.0 g/lit. (T_8), Dimethoate @ 2.0 ml/lit. (T_9), Chlorpyrifos @ 4.0 ml/lit. (T_{10}), Methomyl 2.0 g/lit. (T_{11}), Triazophos @ 4.0 ml/lit. (T_{12}) with a control (T_{13}) were tested in pot using nematode infested soil having 230 J_2/100 cc soil. Data presented in Table 1 showed non-significant differences for germination count.

It clearly indicates that there was no any adverse effect of chemical on seed germination. Plant height was significantly more in T_9 and T_3 followed by T_1, T_2, T_5, T_6, T_7, T_{11} and T_{12}. However, all were statistically at par with each other. Minimum plant height was recorded in control (T_{13}) and showed non-significant difference with T_4, T_5, T_8, T_6, T_{10} and T_{11} (Table 1). Significantly more fresh shoot weight was noticed in Emamectin benzoate @ 1.0 g/lit. (T_3) among all the treatments.

Table.1 Effect of different chemicals on plant growth characters of mungbean

Treatment	Plant growth parameters			
	Germination count/ pot	Plant height, cm	Fresh weight, g	
			Shoot	Root
T_1 (ACET)	3.00	17.75^{ab}	1.72^{bcd}	0.31^{c}
T_2 (CARB)	3.00	18.38^{ab}	1.78^{bcd}	0.38^{b}
T_3 (EMAM)	3.00	20.13^{a}	2.26^{a}	0.49^{a}
T_4 (FIPR)	3.00	16.13^{bc}	1.27^{f}	0.29^{c}
T_5 (IMID)	2.75	17.50^{abc}	1.40^{def}	0.29^{c}
T_6 (SPIN)	3.00	17.88^{ab}	1.77^{bcd}	0.32^{c}
T_7 (THIA)	3.00	18.50^{ab}	1.81^{bc}	0.41^{b}
T_8 (FLON)	3.00	16.00^{bc}	1.15^{f}	0.21^{d}
T_9 (DIME)	3.00	20.13^{a}	1.92^{ab}	0.41^{b}
T_{10} (CHLO)	3.00	16.75^{bc}	1.33^{ef}	0.29^{c}
T_{11} (METH)	2.75	17.50^{abc}	1.49^{cdef}	0.30^{c}
T_{12} (TRIA)	3.00	17.75^{ab}	1.67^{bcde}	0.31^{c}
T_{13} (CON)	3.00	14.50^{c}	0.70^{g}	0.17^{d}
S.Em.±	0.09	0.97	0.11	0.01
C.D. 0.05	NS	-	-	-
C.V. %	6.62	11.03	14.48	9.75

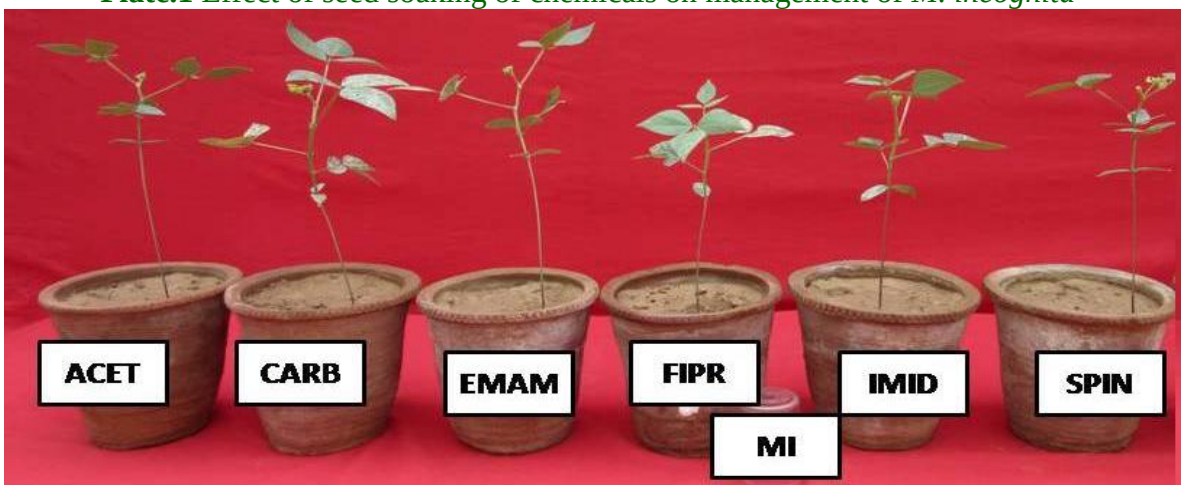
*0 = Free; 5 = Maximum disease intensity. Figures indicating common letters do not differ significantly from each other at 5% level of significance according to DNMRT.

Table.2 Effect of different chemicals on multiplication of *Meloidogyne incognita* on mungbean in pots

Treatment	Nematode population/plant			
	RKI (0-5)* (√x)	Root		Soil (200 cc) (Log X)
		Females/3g (Log X)	Eggs/3g (Log X)	
T_1 (ACET)	2.00^{abcd} (4.00)	1.27^{def} (127.50)	2.85^{def} (711.00)	2.11^{de} (127.50)
T_2 (CARB)	1.78^{e} (3.25)	1.24^{def} (99.75)	2.73^{def} (547.00)	1.99^{f} (99.75)
T_3 (EMAM)	1.57^{f} (2.50)	0.99^{f} (53.00)	2.30^{i} (212.00)	1.72^{g} (53.00)
T_4 (FIPR)	2.05^{ab} (4.25)	1.65^{bc} (181.50)	3.20^{b} (1679.50)	2.26^{bc} (181.50)
T_5 (IMID)	2.00^{abcd} (4.00)	1.59^{bc} (166.50)	2.95^{cd} (898.75)	2.21^{bc} (166.50)
T_6 (SPIN)	1.79^{cde} (3.25)	1.26^{def} (108.25)	2.80^{ef} (637.25)	2.03^{ef} (108.25)
T_7 (THIA)	1.73^{ef} (3.00)	1.22^{def} (99.50)	2.60^{gh} (410.25)	1.99^{f} (99.50)
T_8 (FLON)	2.05^{ab} (4.25)	1.78^{ab} (210.75)	3.38^{a} (2451.75)	2.32^{b} (210.75)
T_9 (DIME)	1.79^{cde} (3.25)	1.16^{ef} (89.00)	2.48^{h} (311.25)	1.94^{f} (89.00)
T_{10} (CHLO)	2.05^{ab} (4.25)	1.62^{bc} (168.25)	3.08^{bc} (1267.50)	2.22^{bc} (168.25)
T_{11} (METH)	2.00^{abcd} (4.00)	1.52^{bcd} (160.00)	2.91^{de} (815.50)	2.19^{cd} (160.00)
T_{12} (TRIA)	1.93^{bcde} (3.75)	1.40^{cde} (146.25)	2.89^{de} (792.00)	2.16^{cd} (146.25)
T_{13} (CON)	2.17^{a} (4.75)	2.01^{a} (362.50)	3.45^{a} (2886.25)	2.55^{a} (362.50)
S.Em.±	0.09	0.09	0.04	0.03
C.V. %	6.62	12.71	2.93	3.09

*0 = Free; 5 = Maximum disease intensity.
Figures in parentheses are re-transformed values of √x and Log X.
Figures indicating common letters do not differ significantly from each other at 5% level of significance according to DNMRT.

Plate.1 Effect of seed soaking of chemicals on management of *M. incognita*



(A) SHOOT

(B) ROOT

Treatment of Dimethoate @ 2.0 ml/lit. (T_9) found next best treatment and remain statistically at par with Emamectin benzoate @ 1.0 g/lit. (T_3). Control had significantly lowest fresh shoot weight. Rest of the treatment has mediocre effect for fresh shoot weight (Table 1, Plate 1). Maximum fresh root weight was recorded in Emamectin benzoate @ 1.0 g/lit. (T_3) and it differ significantly from rest of the treatments. Treatments, T_2, T_7 and T_9 were next best treatments and remain at par with each other and differ significantly with Emamectin benzoate @ 1.0 g/lit. (T_3). Control (T_{13}) has significantly low fresh root weight. It was statistically at par with Flonicamid @ 1.0 g/lit. (T_8). Rest of the treatment has midiocare effect (Table 1, Plate 1). Root knot index was

significantly higher in the T_{13} (control). However, it was statistically at par with the treatment T_1, T_4, T_5, T_8, T_{10}, T_{11} and T_{12}. RKI was significantly less in the treatment of Emamectin benzoate @ 1.0 g/lit. (T_3) as compared to rest of the treatments (Table 2). Treatment T_3 found significantly superior over other treatment having least no. of females/plant, but it did not differ with the treatment of T_1, T_2, T_6, T_7 and T_9. Maximum females were recorded in T_{13} which is statistically at par with T_8. In cause of eggs, treatment T_3 found most effective which has significantly less eggs over other treatments. Maximum no. of eggs was recorded in treatment T_{13} which is statistically at par with T_8. Rest of the treatments has mediocre effect. In case of soil nematode population treatment T_3 turn out significantly better which has lowest nematode population. Treatment T_2, T_6, T_7 and T_9 were statistically at par with each other and closely followed to T_3. Significantly higher nematode population was rescored in T_{13} (Table 2).

References

Chatterjee, D., and Randhawa, G. S. 1952. Standardized Names of Cultivated Plants in India. *Indian J. Horticulture*. 9 (2): 24-36.

Gupta, D. C., and Verma, K. K. 1990. Studies on avoidable losses in mung bean (*Vigna radiata*) due to root-knot nematode, *Meloidogyne javanica* and its control under field conditions. *Indian J. Nematol*. 20 (2): 148-151.

Jain, R. K., Mathur, K. N. and Singh, R. V. 2007. Estimation of Losses due to Plant Parasitic Nematodes on different Crops in India. *Indian J. Nematol.* 37 (2): 219-221.

Khan, M. R., Jain, R. K., Singh, R. V. and Pramanik, A. 2010. *Economically Important Plant Parasitic Nematodes Distribution* Atlas. Directorate of Information and Publications of Agricuture, New Delhi. pp: 10.

Sasser, J. N., and Freckman, D. W. 1987. A world prospective on nematology: the role of the society, *In: Vistas on Nematology*, Edited by J.A. Veech and D.W. Dickson. Society of Nematologists, Hyattsville, MD. Pp: 7-14

Sharma, S. B., Sharma, H. K. and Pankaj 2000. Nematodes problem in India *In:* Crop pest and Disease management-challenges for the millennium (Edited by D. Prasad and S.N. Puri), Joyti Publishers, New Delhi: 267-275.

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