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Department of Nematology, Haryana Agricultural University — Hisar 125004, India

EFFICACY, PERSISTENCE AND FIELD APPLICATION POTENTIAL OF SOME WEEDS/SHRUBS FOR CONTROLLING *MELOIDOGYNE JAVANICA* ON BRINJAL

by
S.N. NANDAL and D.S. BHATTI

Summary. The effects of chopped and finely ground leaves of *Calotropis procera*, *Datura stramonium*, *Ricinus communis* and *Xanthium strumarium* on penetration of juveniles, persistence and gall formation by *Meloidogyne javanica* on brinjal (*Solanum melongena* L.) was studied. All the four plant leaves, at all doses, viz., 10,20,40 and 80 g leaves/kg of river sand reduced juvenile penetration from 97 to 100%. This inhibitory effect lasted up to six weeks. Higher doses (40 and 80 g leaves/kg of river sand) of all the treatments completely prevented juvenile entry up to six weeks. *D. stramonium* at all doses had the lowest number of galls up to 60 days, whereas the other three plant leaves were effective up to 30 days only.

Various workers (Patel and Desai,1964; Johnson *et al.*, 1967; Singh and Sitaramaiah, 1967; Hameed, 1970; Prem Kumar and Nair, 1976) have tested different plant parts/extracts against root-knot nematode with success. The objective of the present study was to evaluate nematicidal efficacy of some weeds/shrubs commonly occurring in our agricultural lands against root-knot nematode, *Meloidogyne javanica* (Treub) Chitw. on brinjal (*Solanum melongena* L.).

Materials and methods

Four weeds/shrubs, namely, *Calotropis procera* (Ait.) R.Br., *Ricinus communis* L., *Xanthium strumarium* L. and *Datura stramonium* L. used in this study were previously found to be very promising in our preliminary screening experiments (Nandal and Bhatti,1983). Finely ground leaves of the four plant species were mixed with river sand at the rates of 10,20,40 and 80 g/kg in 18 cm earthen pots filled with the different mixtures; pots without leaves were kept as a control. Four-week-old brinjal seedlings (cv. Pusa Purple Long) were transplanted singly into each pot. After four days, 500 freshly hatched second-stage juveniles of *M. javanica* were added to each pot. Each treatment was replicated four times and the experiment was maintained in a screenhouse. One week after inoculation, observations were made on juvenile penetration by gently depotting the plants, washing the roots under tap water, staining them with acid fuchsin-lactophenol and clearing in lactophenol.

In a second experiment to ascertain the persistence of any nematicidal effects, leaves of the four plant species were chopped, ground finely with a Waring blender, mixed with sterilized river sand as before and 8 cm earthen pots were filled. Four-week-old brinjal seedlings (Pusa Purple Long) were transplanted in the pots at intervals of 0,1,2,3,4,5 and 6 weeks and a week later each pot was inoculated with 200 freshly hatched second-stage juveniles of *M. javanica*. All the treatments were replicated four times. Juvenile penetration was observed as described before.

In another experiment to evaluate the effect of chopped leaves on the number of galls on brinjal roots, 18 cm earthen pots were filled with heavily infested soil (500 juveniles/250 g soil) mixed with chopped and finely ground

TABLE I - *Efficacy of finely ground plant leaves on penetration of brinjal roots by juveniles of* Meloidogyne javanica.

Treatments	Average number of juveniles/root system one week after inoculation and mixing leaves (g/kg soil)			
Leaves g/kg soil		20	40	80
Calotropis procera	13.0	0.0	0.0	0.0
Datura stramonium	10.7	0.0	0.0	0.0
Ricinus communis	11.2	0.0	0.0	0.0
Xanthium strumarium	14.7	8.5	3.7	0.2
Control	99.5			
C.D. at 5%	0			

TABLE II - *Residual effect of finely ground leaves against juvenile penetration of brinjal roots by* M. javanica.

Treatment	Average number of juveniles/root system recorded one week after transplanting and 72 hours after inoculation																							
	0 week				1 W				2 W				3 W				4 W				5 W				6 W			
Leaves g/kg soil	10	20	40	80	10	20	40	80	10	20	40	80	10	20	40	80	10	20	40	80	10	20	40	80	10	20	40	80
Calotropis procera	2.0	0	0	0	1.5	0	0	0	1.8	0	0	0	3.3	0.2	0	0	2.5	0.8	0	0	3.3	0.3	0	0	3.8	1.3	0	0
Datura stramonium	0.2	0	0	0	0	0	0	0	1.8	0	0	0	2.3	0	0	0	3.5	0.3	0	0	1.8	0.3	0	0	2.7	0	0	0
Ricinus communis	0.7	0	0	0	2.0	0	0	0	1.5	0	0	0	3.3	0	0	0	1.8	0	0	0	1.8	1.0	0	0	2.5	0	0	0
Xanthium strumarium	2.0	0	0	0	0	0	0	0	2.0	0	0	0	3.3	1.5	0	0	4.3	1.0	0	0	3.0	1.5	0	0	5.5	2.3	0.5	0
Control	23.2				25.5				27.5				28.3				25.3				24.5				22.3			
C.D. at 5%	0.3				0.4				0.3				0.2				0.5				0.3				0.3			

leaves of the four species at the rate of 10,20,40,80 g/kg of soil. One week later, a four- week-old brinjal seedling was planted in each pot. Each treatment was replicated four times. Observations on the number of galls/plant root were recorded at one and two months intervals by gently depotting the plants and washing the roots in tap water.

Results and discussion

Data in Table I show that juvenile penetration of *M. javanica* was reduced by all weeds/shrubs tested. Among the treatments, *D. stramonium* was the most effective in inhibiting juvenile penetration followed by *R. communis*, *C. procera* and *X. strumarium*.

The effect of addition of finely ground leaves persisted over a period of six weeks as is evident from the low juvenile penetration in treatments as compared to untreated control (Table II). Among the treatments, *D. stramonium* treated plants had the lowest juvenile penetration at different intervals and doses. The doses 10 and 20 g of leaves/kg of river sand were effective in reducing the juvenile penetration up to three and four weeks, whereas 40 and 80 g leaves/kg were highly inhibitory to juvenile penetration even after six weeks.

Gall formation on brinjal roots was significantly less in treated plants as compared to untreated plants (control) (Table III). Among the treatments, *D. stramonium* treated plants had the lowest number of galls up to 8 weeks at all the doses. *C. procera* and *R. communis* leaves effectively reduced the number of galls up to 4 weeks. The higher doses of 40 and 80 g leaves/kg of soil in all the treatments had the lowest number of galls.

TABLE III - *Gall formation by* M. javanica *on brinjal roots in soil mixed with finely ground leaves.*

Treatment	Ground leaves (g/kg soil)	Average number of galls after a period of weeks	
		4	8
Calotropis procera	10	131	246
	20	77	182
	40	34	197
	80	23	209
Datura stramonium	10	74	103
	20	52	77
	40	19	49
	80	19	48
Ricinus communis	10	123	245
	20	82	228
	40	37	229
	80	25	147
Xanthium strumarium	10	147	230
	20	86	202
	40	68	214
	80	52	143
Control	0	240	271
C.D. at 5%		31.6	94.3

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