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INFLUENCE OF FOUR PLANT EXTRACTS ON THE HATCHING OF *MELOIDOGYNE JAVANICA* AND INVASION OF HOST ROOTS

by
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Inhibition of *Meloidogyne incognita* juvenile hatch is reported to be caused by root-exudates of *Euphorbia hirta* (Yadav, 1970), *Azadirachta indica* (Alam *et al.*, 1975) and aqueous leaf, stem and root extracts of *Tagetes minuta* (Toida, 1972).

In a preliminary test, leaf extracts of 30 plant species were studied for their nematicidal effect on *M. javanica* juveniles (Nandal and Bhatti, 1983). Four weeds [*Calotropis procera* (Ait.) R. Br., *Datura stramonium* L., *Ricinus communis* L. and *Xanthium strumarium* L.] were found to be nematicidally effective and studied further. This paper reports the effect of leaf extracts on hatching, galling and life-cycle development *in vitro* of juveniles of *Meloidogyne javanica* (Treub.) Chitw.

Materials and Methods

The leaf extracts were prepared according to the procedure given by Nandal and Bhatti, 1983. The stock solutions of the leaf extracts were kept in a refrigerator (2-4°C) in plastic bottles.

The effect of leaf extracts on hatching was studied in 100 mm diameter petri-plates with 1:5 and 1:20 dilutions. Plates were fitted with moulded pieces of wire-gauge having two-ply filter papers. Dilutions of each leaf extract were poured at the rate of 25 ml/plate. Five freshly picked egg-masses were placed on the filter paper in each petri-plate. Twenty-five ml of sterile distilled water was poured in the control dishes. Petri-plates were

kept at 27 ± 1°C and juvenile hatch was counted under a stereoscopic microscope after 3, 6 and 9 days. The respective dilutions of leaf extracts were added to the plates daily to prevent drying.

A pot experiment was conducted in October, 1978 in a screen house to evaluate the efficacy of leaf extracts in reducing gall formation on brinjal roots (*Solanum melongena* L. cv. Pusa Purple Long). Four week-old seedlings were transplanted into 15 cm pots filled with sterilized river sand. Four days after transplanting, the sand was drenched with leaf extracts and each pot was infested with 500 freshly hatched second stage *M. javanica* juveniles. Pots were watered regularly and a measured quantity of Hoaglands nutrient solution was applied weekly. After 15, 30, 45 and 60 days the plants in the pots of each treatment were uprooted, their roots washed gently under tap water and the number of galls on each plant counted.

An experiment was begun in April, 1978 to study the influence of leaf extracts on the life-cycle development of *M. javanica* on brinjal. Brinjal (cv. Pusa Purple Long) seeds were planted in sterilized river sand in 12 cm clay pots. At germination the seedlings were thinned to one per pot. Each pot was drenched with leaf extract or water. Each plant was infested with 100 freshly hatched second-stage *M. javanica* juveniles. At 2 day intervals, following nematode inoculation of the pots, three plants of each treatment were gently uprooted and the roots washed under tap water, stained with acid-fuchsin-lactophenol and cleared in plain lactophenol. The juveniles from the roots were teased out, put on a glass slide in a drop of clear lactophenol and observed for life-cycle development from the second stage to egg-laying females.

All leaf extracts were tested at two different dilutions (1:5 and 1:20 in water) and each experimental treatment except that on the life-cycle of the nematode, which was replicated three times, was replicated four times.

Results and Discussion

Juvenile hatch was significantly less after 3, 6 and 9 days exposure to leaf extracts compared with the control. The 1:5 dilution of each extract was significantly more effective than 1:20. *R. communis* at both dilutions was significantly better in the reduction of hatching.

Gall formation was significantly reduced in all plants treated with leaf extracts (Table II). *D. stramonium* at both dilutions and *R. communis* at 1:5 had significantly fewer galls with respect to other treatments. However,

the nematicidal efficacy of the extracts decreased with time, resulting in more galls after 45 days. This may be due to degradation of the toxic component.

Observations on the life-cycle of the nematode show that none of the leaf extracts had any effect on the development of *M. javanica* in comparison with the control.

Table I - *Effect of leaf extracts on hatching of* Meloidogyne javanica.

Treatment	Dilution	Number of second-stage juveniles hatched from 5 egg-masses after		
		3 days	6 days	9 days
Calotropis procera	1:5	194	251	264
	1:20	396	400	407
Datura stramonium	1:5	125	130	131
	1:20	365	405	418
Ricinus communis	1:5	73	102	80
	1:20	353	366	396
Xanthium strumarium	1:5	152	170	195
	1:20	403	416	493
Control		714	797	1129
S.E. (m)		23.69	25.68	38.60
C.D. at 5%		68.72	74.50	111.97

Table II - *Effect of leaf extracts on number of galls caused by* Meloidogyne javanica *of brinjal roots at different intervals after infestation.*

Treatment	Dilution	Number of galls per plant after			
		15 days	30 days	45 days	60 days
Calotropis procera	1:5	4.7	10.0	19.2	19.7
	1:20	13.2	19.7	31.5	32.2
Datura stramonium	1:5	3.0	8.0	16.5	21.5
	1:20	8.0	10.0	22.0	19.7
Ricinus communis	1:5	4.0	12.5	17.2	17.7
	1:20	11.0	23.2	26.0	32.2
Xanthium strumarium	1:5	7.2	18.5	25.7	27.7
	1:20	19.2	29.0	33.7	34.0
Control		30.2	46.5	62.7	48.7
S.E. (m)		1.98	3.67	5.27	3.91
C.D. at 5%		5.74	10.65	15.29	11.34

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