Nematol. medit. (1996), 24: 49-51

Nematology and Phytochemistry Labs., Indian Institute of Horticultural Research, Hessaraghatta Lake (P. O.), Bangalore - 560 089, India

EFFECT OF SOME SECONDARY PLANT METABOLITES AS SEED TREATMENT AGENTS AGAINST *MELOIDOGYNE INCOGNITA* ON TOMATO

by

M. S. Rao, P. Parvatha Reddy, Archana Mittal[1], M. V. Chandravadana and M. Nagesh

Summary. Serpentine, an indole alkaloid isolated from the roots of *Catharanthus roseus* and citronellol and geraniol, essential oils of *Pelargonium graveolens* were tested for their efficacy as seed treatment agents against *Meloidogyne incognita* on tomato. At 0.2% conc. they both significantly increased growth of tomato and decreased *M. incognita* infestation. Seed treatment with serpentine or citronellol at 0.5% conc. did not increase the growth of tomato, though it significantly reduced the root-knot nematode infestation. Geraniol at 0.2 or 0.5% conc. did not decrease root-knot nematode infestation.

Serpentine, an indole alkaloid isolated from the roots of *Catharanthus roseus* G. Don (Apocyanaceae) (Chandravadana *et al.*, 1994), and essential oils (Citronellol and geraniol) of *Pelargonium graveolens* L. have been reported to have a nematicidal effect on *Meloidogyne incognita* (Leela *et al.*, 1992) *in vitro*. Therefore, the efficacy of serpentine, citrenellol and geraniol were tested as seed treatments against *M. incognita* (Kofoid *et* White) Chitw. on tomato (*Lycopersicon esculentum* Mill. var. Pusa Ruby).

Materials and methods

Serpentine was isolated from the roots of *Catharanthus roseus* according to the procedure of Chandravadana *et al.* (1994). Samples of citronellol and geraniol supplied by Aldrich Co. Ltd. were used in the experiments. Batches of seeds were soaked in serpentine, citronellol and geraniol solutions at 0.2 or 0.5% concentration for 20 minutes and then dried in the shade. To check that the treatments had no adverse effect on germination, the seeds were placed on moistened Whatman filter paper No. 1 in a Petri dish, then sown in seed pans (30x15 cms) filled with soil containing 1 J_2 of *M. incognita* per g. The treatments were replicated five times. Untreated seeds were used as control. From each seed pan 10 seedlings (30 day old) were removed to measure seedling length, weight and number of root galls.

In another experiment seeds treated as above were sown in seed pans filled with sterilized soil. Thirty-day old seedlings were transplanted singly into pots filled with 2 kg infested soil containing 1 J_2 per g. Each treatment was replicated 5 times. Two months after inoculation the plants were harvested and observations on plant growth parameters, root-knot index, root and soil populations were recorded.

[1] Present address: IARI, New Delhi-12, India. IIHR Contribution No. 25/95.

Results and discussion

Seed treatment with serpentine and citronellol at 0.2 and 0.5% conc. was significantly effective in decreasing the number of galls in seedlings of tomato (Table I). Seed treatment with serpentine and citronellol at 0.2% concentration significantly increased the growth of seedlings. Although serpentine and citronellol at 0.5% conc. significantly decreased the number of galls on roots, they did not significantly increase the growth of the seedlings (Table I). Geraniol at 0.2 and 0.5% conc. was not effective in decreasing number of galls on the roots and increasing the growth of seedlings (Table I).

Similarly, seedlings raised in sterilized soil after seed treatment with serpentine or citronellol at 0.2 and 5% conc. when transplanted in infested soil were less infected by *M. incognita*. Serpentine and citronellol at 0.2% conc. significantly increased the growth of the transplanted tomato plants (Table II). Serpentine and citronellol at 0.5% did not significantly increase the growth of tomato, although these treatments were significantly effective in decreasing the root-knot index and number of root-knot nematodes (Table II). Geraniol treatments affected the growth of tomato plants adversely and did not decrease root-knot nematode infestation (Table II).

TABLE I - *Effect of seed treatment on the growth of seedlings of tomato and root-galls produced by* Meloidogyne incognita.

Treatment	Conc.	Seedling length (cm)	Seedling weight (g)	No. of galls/ 10 seedlings
Serpentine	0.2%	26.4	2.8	42
Serpentine	0.5%	20.5	2.0	34
Citronellol	0.2%	24.2	2.4	49
Citronellol	0.5%	16.7	1.7	36
Geraniol	0.2%	17.7	1.5	72
Geraniol	0.5%	13.2	1.4	65
Control		18.5	1.5	76
C.D. 5%		4.52	0.32	8.24

TABLE II - *Effect of seed treatment on growth of tomato and reproduction of* M. incognita.

Treatment	Conc.	Shoot length (cm)	Shoot dry weight (g)	Root length (cm)	Root dry weight (g)	Root-knot index	Final (Root + soil) population
Serpentine	0.2%	64.3	6.2	28.3	2.8	2.6	3947
Serpentine	0.5%	51.2	4.8	20.5	2.0	2.3	3014
Citronellol	0.2%	60.8	5.6	20.6	2.0	3.0	4546
Citronellol	0.5%	48.6	4.5	26.8	2.4	2.5	3582
Geraniol	0.2%	47.2	4.6	15.4	1.8	3.8	5269
Geraniol	0.5%	42.1	4.0	13.6	1.5	3.6	6748
Control		46.3	4.2	17.7	1.3	4.3	7688
C.D. 5%		7.24	0.84	3.2	0.27	0.34	529.56

In conclusion it seems that seed treatments with serpentine or citronellol make tomato less susceptible to *M. incognita.*

Acknowledgements. Authors thank Dr. I. S. Yadav, Director, Indian Institute of Horticultural Research, Bangalore, for providing facilities.

Literature cited

CHANDRAVADANA M. V., NIDIRY E. S. J., KHAN R. M. and RAO M. S., 1994. Nematicidal activity of serpentine against *Meloidogyne incognita. Fundam. appl. Nematol., 17*: 185-186.

LEELA N. K., KHAN, R. M., REDDY P. P. and NIDIRY E. S. J., 1992. Nematicidal activity of essential oil of *Pelargonium graveolens* against the root-knot nematode *Meloidogyne incognita. Nematol. Medit., 20*: 57-58.

Accepted for publication on 6 October 1995.