

Plant Protection Research Centre, Abu-Ghreib, Baghdad, Iraq

THE EFFICACY OF NEMATICIDES AND HORSE MANURE IN CONTROLLING ROOT-KNOT NEMATODES ON TOMATO AND EGGPLANT

by
Z. A. STEPHAN

Summary. Nematicides and horse manure significantly ($P=0.01$) increased the yield and reduced the infection of the root-knot nematode *Meloidogyne javanica* on tomato and eggplant. Cadusafos (6 g/m^2), liquid phenamiphos (5 cc/m^2) and dichloro-fenthion (20 g/m^2) were the most effective, followed by horse manure. Oxamyl and carbofuran, at concentrations of 3 cc/l water and 15 g/m^2 , respectively, provided some nematode control and increased yields.

Root-knot nematode, *Meloidogyne javanica*, is one of the most serious plant parasitic nematodes in plastic and glasshouse grown vegetables in Iraq (Stephan *et al.*, 1988). Soil disinfestation with nematicides, solar heating and other radical treatments have been used as a successful management tool in controlling nematode pests.

This study investigated the effect of different nematicides and horse manure on the root-knot nematode, *M. javanica* (Treub) Chitw. under glasshouse conditions.

Materials and methods

One experiment was conducted in Rashidiya commercial glasshouses 40 km north of Baghdad. The nematicides and rates of application are listed in Table I. Phenamiphos 40% a.i. was applied to the soil in the irrigation water. Oxamyl was applied as a foliar spray one week after transplanting and thereafter twice at 3-weekly intervals at the rate of 3 cc/l of water. All the others and horse manure were broadcast on the soil

TABLE I - Effect of different nematicides and horse manure on tomato growth and yield in soil infested by *M. Meloidogyne javanica*.

Treatment	Dose	Yield weight (Kg)	Plant height (cm)	Plants infested (%)	No. of nematodes/g soil
Control	—	155	224	93	199
Phenamiphos 40% L.	5 cc/m^2	306	298	11	33
Carbofuran 5 G	15 g/m^2	235	260	23	50
Oxamyl 24% L	3 cc/l	231	271	28	53
Cadusafos 10%	6 g/m^2	316	301	7	19
Horse manure	0.5 kg/m^2	292	271	21	44
Dichloro-fenthion 5% G	20 g/m^2	296	290	15	20
L.S.D. 5%		36.82	13.51	5.25	4.37
L.S.D. 1%		50.12	18.39	7.15	5.95

TABLE II - Effect of different nematicides and horse manure on eggplant yield in soil infested by *M. javanica*.

Treatment	Dose	Yield weight (Kg)	Plants infected (%)	No. of nematodes/g soil
Control	–	135	100	55
Phenamiphos 40% L	5 cc/m ²	212	13	4
Carbofuran 5 G	15 g/m ²	201	52	12
Oxamyl 24% L	3 cc/l	170	55	11
Cadusafos	6 g/m ²	217	8	4
Horse manure	0.5 kg/m ²	210	10	2
Dichloro-fenthion 5%	20 g/m ²	219	11	5
L.S.D. 5%		22.51	6.9	4.3
L.S.D. 1%		31.64	9.4	5.8

surface and thoroughly incorporated into the top 20-25 cm, 3-weeks before planting tomato (*Lycopersicon esculentum* Mill.) cv. Monte Carlo. A second experiment was carried out at Mussaib Technical glasshouses Institute, 70 km south of Baghdad on eggplants (*Solanum melongena* L.) cv. Local. Treatments are listed in Table II.

There were four replicates in each glasshouse which was planted with four week old seedlings on 1 October 1993. There were 40 and 100 plants in each 20 m and 50 m x 1.5 plot, with 50 cm between plants and 1 m between rows in Mussaib and Rashidiya glasshouses, respectively.

Observations regarding yield (weight), percent of infested plants, plant height (in tomato plants only) and soil nematode population were made 210 days after transplanting. The data were subjected to statistical analysis of variance.

Results and discussion

All treatments in both experiments significantly ($P=0.01$) increased the yield of tomato and eggplant and decreased percentage of plant infection and nematode population and plant height for tomatoes compared with the controls (Tables I and II). However, cadusafos, phenamiphos and dichloro-fenthion were the best, followed by horse manure. Yields of tomato were

increased by 47 to 51%, and those of eggplant 36 to 38% compared to the control. Although treatments with oxamyl and carbofuran significantly ($P=0.01$) increased the yield of tomato and eggplant, they were significantly ($P=0.01$) less effective than the other nematicides (Tables I and II).

The results from both experiments indicated that root invasion by nematodes was delayed for 150-180 days after transplanting. The root galls in infected plants treated with cadusafos, phenamiphos, horse manure and dichloro-fenthion were few and small and the numbers of nematodes/g soil were low compared to those of the untreated control.

Previous investigation have revealed that dichloro-fenthion can be phytotoxic when applied during or after transplanting and was less effective in nematodes control (Stephan *et al.*, 1994).

Literature cited

- STEPHAN Z. A., ALWAN A. H. and ANTOON B. G., 1988. Effect of planting dates on the development of root-knot nematode, *Meloidogyne javanica*, and its effect on plant production, percentage of infection on tomato, eggplant and cucumber inside greenhouse. *Zanco*, 6: 59-68.
- STEPHAN Z. A., ANTOON B. G. and SHAMOUEL M., 1994. Effectiveness of dichloro-fenthion against root-knot nematode on tomato plant roots. *Iraqi J. Agric. Sci*, 24: 76-80.