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COMBINED CONTROL OF ROOT-KNOT NEMATODE AND LEAF CURL DISEASE IN TOMATO

by

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The white fly (*Bemisia tabaci* Gen.) transmitted leaf curl virus disease and root-knot nematodes, *Meloidogyne incognita* (Kofoid *et* White) Chitwood are major obstacles to the successful production of tomatoes in India. Damage caused by either of the pathogens is accentuated in the presence of the other (Swaroop and Goswami, 1969; Mayee *et al.*, 1974). Some biocides have shown promise in controlling both pathogens (Sastry and Singh, 1971; Chhabra and Mahajan, 1974) and the results of further experiments with an extended range of biocides are reported here.

Materials and methods

Six biocides with insecticidal and nematicidal properties were used at different rates for two years in a field naturally infested with *M. incognita* and where leaf curl virus infections were prevalent. The tomato cultivar S-12, susceptible to leaf curl and root-knot, was used in an experiment consisting of seven treatments (Table I) each replicated three times, in plots of 27 plants and arranged in a randomized block design. The application of each biocide was split

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into two, half applied at the time of sowing in a nursery seed-bed and half when the seedlings were transplanted in the field plots.

Soil populations of root-knot were assessed from 250 ml soil samples extracted by a modified Cobb's sieving and decanting method and larvae in roots by macerating 10 g samples of roots in a blender and overnight extraction over wire screens. Leaf curl infection was calculated by the method of Mayee *et al.* (1975) and mean white fly populations were assessed from leaf counts.

Table I - *Effect of granular biocides on the control of root-knot nematodes and leaf curl disease in tomato.*

Treatment (Kg a.i./ha)	Nematode Population		No. larvae (10 g. roots)	leaf curl coefficient	Mean Whitefly per plant	Yield per plant (Kg)
	pre-treatment	post-treatment				
Fensulfothion (10)	377	17	16.8	12.4	9.8	6.3
Aldicarb (5)	247	20	19.3	13.0	12.3	6.2
Carbofuran (9)	350	27	22.5	18.0	12.4	5.5
Disulfoton (4)	423	323	67.3	10.6	10.7	5.8
Dimethoate (9)	433	207	55.4	17.9	14.1	5.5
Phorate (5)	473	157	47.5	11.2	11.1	6.4
Control	350	833	108.5	23.9	23.9	3.1
C.D. ($p = 0.05$)	NS	26.2	19.2	2.8	2.1	1.0

Results and conclusions

All treatments significantly decreased root-knot populations and controlled leaf curl disease compared with the untreated control (Table I). However, significant yield increases of harvested fruits were associated with only phorate, fensulfothion and aldicarb. The largest yield of fruit (6.4 kg/plant) was obtained from the phorate treatment but this cannot entirely be related to nematode or disease control. Carbofuran substantially decreased root-knot nematode populations but yields were only marginally better than the control because of the lack of control of leaf curl disease, although white fly populations decreased significantly. Conversely, disulfoton provided

good control of white fly and had the least infestation of leaf curl but there was no significant increase in yield because of the relatively poor control of nematodes. Where root-knot nematodes and leaf curl virus occur simultaneously effective control of both pathogens is necessary to obtain significant increases in yield.

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