

## Combination Treatments for the Control of Virus Vector, Nematodes, Fungal and Viral Diseases of Tomato

By

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### ABSTRACT

Two field experiments were conducted during 1975 to evolve a suitable combination treatment of insecticide and fungicide against virus vector, nematode and fungal diseases. Statistical scrutiny of pooled data of both the experiments revealed that drenching the nursery with dexion 0.025 per cent 15 days after sowing, application of aldicarb granule at 1.0 kg a.i./ha after 7 days of transplanting followed by dithane M-45 0.2 per cent spray at 30 days after transplanting and dithane+endosulfan 0.07 per cent at 45 and 60 days after transplanting was very effective. The efficacy of different combination treatments on the control of pests and diseases, as well their influence on the yield are discussed.

### INTRODUCTION

Tomato is being infected by a number of fungal and viral pathogens, besides a few nematodes and insect pests. Over years, intensive research in controlling these organisms individually, has led to fruitful results. Effective chemical treatments have been identified for the control of leaf curl virus spread (Sastry and Singh, 1971; Butter and Ratanl, 1973; Singh *et al.*, 1973), *Alternaria* leaf spot (Johnson, 1969; Lakshmi Ramakrishnan *et al.*, 1971), damping off (Muthusamy *et al.*, 1973; Lakshmi Ramakrishnan *et al.*, 1973) and nematodes (Sivakumar *et al.*, 1974). However, attempts have not been made so far to evolve an effect-

ive, common control schedule which would protect the crop from damage by insects, nematodes, fungal and viral diseases. To fulfill this objective, field experiments were conducted and the results are presented.

### MATERIALS AND METHODS

Two field experiments were conducted, the first during January to April and the second during August to November, 1975, at Tamil Nadu Agricultural University, Coimbatore, in randomized block design with three replications and nine treatments. Tomato varieties Co 1 and Co 2 were used in the first and second experiments. Fifteen days after sowing, the

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nursery was drenched with dexton 0.025 per cent to protect the seedlings against damping off. The treatments tried in the main field were: 1. Carbofuran granule 1.0 kg a.i./ha (7 days after transplanting - (DAT) followed by monocrotophos 0.05 per cent spray (45, 60 DAT) and dithane M-45 0.2 per cent spray (30, 45, 60 DAT), 2. Carbofuran granule 1.0 kg a.i./ha (7 DAT), followed by endosulfan 0.07 per cent spray (45, 60 DAT) and dithane M-45 0.2 per cent spray (30, 45, 60 DAT), 3. Aldicarb granule 1.0 kg a.i./ha (7 DAT), followed by monocrotophos 0.05 per cent spray (45, 60 DAT) and dithane M-45 0.2 per cent spray (30, 45, 60 DAT), 4. Aldicarb granule 1.0 kg a.i./ha (7 DAT), followed by endosulfan 0.07 per cent spray (45, 60 DAT) and dithane M-45 0.2 per cent spray (30, 45, 60 DAT), 5. Monocrotophos 0.05 per cent spray (15, 30, 45, 60 DAT), and dithane M-45 0.2 per cent spray (30, 45, 60 DAT), 6. Endosulfan 0.07 per cent spray (15, 30, 45, 60 DAT), and dithane M-45 0.2 per cent spray (30, 45, 60 DAT), 7. monocrotophos 0.5 per cent spray (15, 30, 45, 60 DAT), 8. Dithane M-45 0.2 per cent spray (30, 45, 60 DAT), and, 9. Untreated check.

The population of white fly (*Bemisia tabaci*) vector transmitting leaf curl virus was assessed in three leaves in each of 10 plants selected at random, in each plot. Assessments were made at 10 days interval from 15th day after transplanting, up to 55 days. The leaf curl incidence was recorded 30, 45 and 60 days after planting, as percentage of diseased plants with

reference to healthy plants. The population of *Rotylenchulus reniformis* was assessed in the first experiment from 200 g of composite soil sample, and that of *Pratylenchus delettrei* in the second experiment, from 200 g of root material collected from each plot, after completion of all treatments. The incidence of *Alternaria* leaf spot was assessed in 10 plants selected at random, in each plot and the percentage of disease intensity was worked out. The observations recorded in both the experiments were pooled and analysed statistically.

## RESULTS AND DISCUSSION

The incidence of white fly, leaf curl, nematode and leaf spot is presented in the Table. There was significant reduction in the population of white fly, nematodes and diseases due to treatments with various combinations of insecticides and fungicides, over untreated check. Among the treatments, the lowest incidence of white fly, leaf curl and *Pratylenchus delettrei* was recorded in the combination treatment of aldicarb, endosulfan and dithane (T4). The yield recorded in this treatment was also high to the extent of 219.4 per cent over the untreated check. The incidence of *Alternaria* leaf spot was the lowest in T2, although it was on par with T8, 4, 3 and 6. The difference between the treatments with regard to population of *R. reniformis* recorded in the first experiment, was however, not significant. In view of the effective control of the insect vector, leaf curl incidence, nematodes and leaf spot, as well the

TABLE Incidence of pests and diseases in different treatments (Pooled data)

Treatment	Mean population of insect/nematode and incidence of disease						
	White fly (T.V.)	Leaf curl (T.V.)	Nematode ( <i>R. reniformis</i> ) (@) (in 200 g soil)	Nematode ( <i>P. delettref</i> ) (@@) (in 200 g root)	<i>Alternaria</i> leaf spot (T.V.)	Yield (kg/plot)	Additional profit over check (Rs/ha)
Carbofuran G. 1.00 kg a.i./ha							
Monocrotophos 0.05%	0.79	1.50	343.3	80.0	47.32	25.9	2753
Dithane M-45 0.2%							
Carbofuran G. 1.00 kg a.i./ha							
Endosulfan 0.07%	0.79	1.36	1463.3	56.7	35.67	25.9	5283
Dithane M-45 0.2%							
Aldicarb G. 1.00 kg a.i./ha							
Monocrotophos 0.05%	0.79	0.91	795.0	36.7	38.22	27.5	4483
Dithane M-45 0.2%							
Aldicarb G. 1.00 kg a.i./ha							
Endosulfan 0.07%	0.75	0.71	1073.3	26.7	36.73	42.8	10065
Dithane M-45 0.2%							
Monocrotophos 0.05%							
Dithane M-45 0.2%	0.84	1.41	1090.0	60.0	45.00	17.5	1001
Endosulfan 0.07%							
Dithane M-45 0.2%	0.83	1.34	581.7	156.3	39.21	21.2	2521
Monocrotophos 0.05%	0.87	1.64	916.7	43.3	54.99	15.7	455
Dithane M-45 0.2%	0.90	2.00	868.3	103.3	36.23	10.8	-1028
Untreated check	1.00	2.03	2303.3	153.3	55.07	13.4	—
F Test	**	**	N. S.	*	**	**	
C.D. (P=0.05)	0.08	0.36	—	75.90	8.50	12.25	

@—Recorded in Experiment-I only

@@—Recorded in Experiment II only

\*\*—Significant at 1% level

\*—Significant at 5% level N.S.—Not significant

T. V.—Transformed value

increased yield recorded, it could be concluded that drenching the nursery with dexton 0.025 per cent 15 days after sowing, followed by application of aldicarb granule at 1.0 kg a.i./ha, a week after planting and spraying with

dithane M-45 0.2 per cent at 30 DAT and dithane + endosulfan 0.07 per cent at 45 and 60 DAT would be an effective combination in protecting tomato crop from major pests and diseases.

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