https://doi.org/10.29321/MAJ.10.A02783

Madras agric. J. 69, (11): 742—745 November 1982

Effect of Fungicidal Treatments on Seed-Mycoflora of Lycopersicon esculentum Mill.

I. D. SINGH[1], S. K. GURURANI[2], K. N. PANDEY[3] and R. C. GUPTA[4]

Ten fungicides, each in three concentrations, were tested against the seed mycoflora and percent germination of seeds of *Lycopersicon esculentum*. Amongst the fungicides tested, Phalton 50w, at 100 ppm, showed the best result inhibiting all the fungi associated with the seeds and had no adverse effect on seed garmination, whereas, Cyprex showed its toxic effect on seed germination along with inhibition of all the fungi associated with the seeds. Other fungicides showed varied effects.

Seed mycoflora has attracted the attention of several workers with various viewpoints (Neergard, 1965; Lalithakumari *et.al.*, 1971). The fungi associated with seeds cause some severe diseases. The spread of such diseases can be checked by the use of certain control measures. Present paper deals with the study of the effect of certain fungicides on seed mycoflora of *Lycopersicon esculentum* Mill. *in vitro*.

MATERIAL AND METHODS

Ten fungicides *viz.*, Tersan OM [45% Thiram+10% 2, Chloro-4-(hydroxymercury) phenol]; Thylate (Thiram, 65% WP); Dithane Z-78 (zineb, 75% WP); Cupravit (73.5% copper oxychloride, WP); Phygon XL-50w (Dichlone, 50% WP); Karathane WD [mixture of 2-(1-metylheptyl)-4,6-dinitrophenol and 2-(1-methylheptyl)-4, 6-dinitrophenol chloronate, 25 WD and L.C.]; Phalton 50 W (Falpet, 50% WP) Fermate (Ferbam, 76% WP): Blitox [copper oxychloride (50% copper)] and Cyprex (Dodine, 65% WP) were tested against the seed mycoflora. Three concentrations *viz.*, 100, 200 and 300 ppm of each of the fungicides were prepared in sterilized water and 400 seeds were placed in each of 250 ml flasks, containing fungicidal suspension. The flasks were shaken for half an hour on a mechanical shaker and placed at room temperature for 48 hr. Potato dextrose agar medium was prepared and was autoclaved at 15 lb/in^2 pressure. The sterilized medium was solidified, in Petri dishes containing 15 ml medium in each. The treated seeds were then inoculated onto it and all such plates were incubated at 25± 1°C temperature in intermittent NUV light and darkness of 12 hr duration. For control, sterilized plates containing sterile water was used in place of fungicidal suspension. The mycoflora was analysed after a week of incubation.

1. Department of Botany. Govt. P. G. College Kashipur, Nainital.
2. Department of Chemistry, Govt. P. G. College. Kashipur, Nainital.
3-4. Department of Botany. Kumaun University Campus, Almora.

To find out the effect of the fungicides on seed germination, the seeds treated with fungicides were inoculated in the Petri dishes having sterilized moist blotting papers and incubated as mentioned above. Percent germination was recorded daily upto a week, till the germination of seeds was over. Results are given in the Tables 1, 2 and 3.

RESULTS AND DISCUSSION

The non-treated seeds were found to be infested with six species of fungi *Aspergillus flavus*, *A. niger*, *Cephalophora irregularis*, *Chaetomium spirale*, *Syncephalastrum racemosum* and *Trichoderma lignorum*. Amongst the fungicides tested-Tersan OM, Thylate Phygon XL-50W, Phalton 50w and Cyprex checked the appearance at all the concentrations. Other fungicides reduced the number of fungi. So far as the effect of fungicides on seed germination is concerned, Tersan OM (100 and 200 ppm), Cupravit (100 ppm), and Blitox (200ppm) increased the percent seed germination (Table 1). Percent seed germination and growth of root and shoot system were highly inhibited in case of Cyprex treated seeds (Table 2).

In the present study *A. flavus* and *A. niger* were found to be dominant fungal species which are potent producers of mycotoxins e.g. aflatoxins. These are reported to cause cirrhosis and cancer in human beings and livestock (Brook. and White, 1966). Phalton 50w was the best amongst all the fungicides tested, to check the appearance of fungi. Cupravit at 100 ppm increased the percent seed germination but did not show complete fungal inhibition. Similar results were recorded with Blitox at 200 ppm and Tersan at 100 ppm. The decrease and/or increase in percent seed germination in response to the treatment with different concentrations of the fungicides indicate that the process of germination of seed is directly affected by the nature and the concentration of the fungicides.

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Table 1 Effect of fungicides on percent germination of seeds of *L. esculentum*

Fungicides	Percent germination of seeds in different concentrations of fungicides					
	100 ppm	't'	200 ppm	't'	300 ppm	't'
Tersan-OM	80	9.54	75	3.75	50	18.36
Thylate	55	13.38	52	16.33	50	18.38
Dithane Z-78	55	13.26	45	22.68	30	36.81
Cupravit	85	13.42	70	—	60	8.95
Phygon XL-50W	55	12.96	50	19.23	45	24.22
Karathane WD	70	—	65	3.72	55	13.67
Phaltan 50W	70	—	60	9.35	45	14.73
Fermate	45	23.88	30	35.44	20	46.12
Blitox	70	—	80	9.23	65	3.89
Cypre	20	45.16	20	45.18	20	45.93
Control			70			

't' values are significant at 1% level.

Table 2. Effect of fungicides on the growth of root and shoot systems of *Lycopersicon esculentum*

Fungicide	Concentration (ppm)	Length of root (mm)	't'	Length of shoot(mm)	't'
Terson-OM	100	25.2	4.8*	20.6	2.6*
	200	20·2	0.0**	18.4	0.2**
	300	18.3	1.5*	14.6	3.6*
Thylate	100	17.5	2 8*	14.7	3.3*
	200	16.3	3 6	13·5	4 6*
	300	15.5	4.8*	12.7	5.3*
Dithane Z-78	100	16.2	3.2*	14.3	3 3*
	200	12 4	6.9*	8.3	9.7*
	300	8.5	11.3	6.5	10.7
Cupravit	100	25.0	4.3*	20.1	1.9
	200	20.3	0 03**	18.1	0.0**
	300	17.7	2.7	15 5	2.8*
Phygon XL-50W	100	15.5	4.2	13.8	4.7
	200	13.6	6.7*	10.5	7.2*
	300	12.8	6.9*	9.7	8.8*
Karathane WD	100	20.0	—	18.0	—
	200	18.4	1.2*	15.3	2.5*
	300	11.2	8.8*	9.4	8.4*
Phaltan 50W	100	19.5	0.2**	17.6	0.3**
	200	15.5	4.4*	13.8	4 2*
	300	9.4	10.7*	8.3	9.3*
Fermate	100	9.4	10.2*	8.3	9.4*
	200	6.6	12.4*	4.5	13.3*
	300	3.1	16.2*	2.5	16.1*
Blitox	100	19.8	0.6**	18 0	0.0
	200	23.7	2.7*	19.6	1.2*
	300	18.8	1.3*	16.4	1.5*
Cyprex	100	2.5	17.2*	1.5	16.0*
	200	2.5	17.3*	1.5	17.3*
	300	1.5	18.1*	1.4	18.3*
Control		20.0	—	18.0	—

* Significant at 1% level.

** Incignificant.