

Bio-efficacy of fungicides in the control of *Phytophthora* incited diseases of potato and pointed gourd

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Relative efficacy of new fungicides against late blight of potato and stem rot of pointed gourd caused by *Phytophthora infestans* and *P. cinnamomi* respectively were evaluated under field conditions. One pre-infection and three post-infection foliar sprays of Metalaxyl 8% + Mancozeb 64% WP (0.25%), Propineb 75% WP (0.3%) or Carbendazim 12% + Mancozeb 63% WP (0.15%) at 7-10 days intervals significantly reduced late blight of potato and showed their superiority over the efficiency of Copper Oxchloride 50% WP (0.4%), the check fungicide. During monsoon months three therapeutic foliar sprays of Metalaxyl 8% + Mancozeb 64% WP (0.25%), Metalaxyl 68 WG (0.2 %) or Azoxystrobin 25SC (0.1%) at 8-10 days intervals were highly effective in controlling stem rot of pointed gourd.

Key words : Potato, pointed gourd, *Phytophthora*, fungicides

INTRODUCTION

Diseases caused by *Phytophthora* spp. become a limiting factor in successful cultivation of potato and pointed gourd in the Gangetic Plain of West Bengal. Severe damage of foliage and haulms due to late blight disease normally occurs in "Kufri Chandramukhi", K-22, S-1. Besides, "Kufri Jyoti", a widely grown resistant variety needs be protected from late blight due to its susceptibility towards newly developed races of *P. infestans* under congenial weather condition (Dutt et al, 1982).

Another species of the genus *Phytophthora* (eg. *P. cinnamomi*) causes serious damage to the vines and fruits of pointed gourd during rainy season.

Experiences of variable efficacy of copper fungicide and Mancozeb against *Phytophthora* incited diseases of potato and pointed gourd in different agroclimatic zones (Vasudeva and Azad, 1952 ; Choudhury, 1954 ; Dutt, 1962) have prompted to evaluate the efficacy of new fungicidal formulations for the control of *Phytophthora* incited diseases. In this communication, efficacy of eight fungicides were assessed against potato late blight and stem rot

of pointed gourd.

MATERIALS AND METHODS

Late blight of Potato

Seven fungicides viz. Metalaxyl 8% + Mancozeb 64% W.P. @ 2.5 g/l; Copper Sulphate + Amino Acid 12.5%, S.C. @ 1.5 ml/l; Carbendazim 12% + Mancozeb 63%, W.P. @ 1.5 g/l; Propineb 75% W.P. @ 3 g/l; Kasugamycin 3% SL @ 2 ml/l; Hexaconazole 2% SC @ 1.5 ml/l and copper oxchloride 50% W.P. @ 4.0 g/l were sprayed separately on the one month old potato plants of variety "Kufri Chandramukhi" grown in separate plots (each 25 sq. mt. area) at farmers' field of Tarakeshwar block under Hooghly district of West Bengal. Subsequently, three more sprays were repeated on 15th, 25th and 35th day following the date of first spray. The untreated plot was sprayed simultaneously with plain water to compare the treatment effect on the disease. Late blight scores were recorded periodically following the scale as prescribed by Clive James (1971). Standard methods were followed for disease indexing. The mean Percentage Disease Index (PDI) value of three locations are presented in Table 1.

Stem rot of pointed gourd

Six fungicides namely Metalaxyl 8% + Mancozeb 64% W.P. @ 2.5 g/l; Metalaxyl 68 W.G. @ 2.0 g/l; Propineb 75% W.P. @ 3.0 g/l; Copper oxychloride 50% W.P. @ 4.0 g/l; Azoxystrobin 25 S.C. @ 1 ml/l; Carbendazim 12% + Mancozeb 63% W.P. @ 1.5 g/l were applied thrice at 8-10 days interval as foliar spray on variety "Kajli" during rainy season at farmer's field of Haringhata block under Nadia dis-

following first spray application. The effect of Metalaxyl 8% + Mancozeb 64% combination for disease reduction was followed by Propineb 75 W.P. (97.14%), Carbendazim 12% + Mancozeb 63% W.P. (94.44%) and copper Oxychloride 50% W.P. (75.87%) as against PDI of untreated check (67.1%).

Stem rot of pointed gourd**Table 1 :** Percentage disease index and disease reduction of late blight on different dates after fungicide application

Fungicides	Doses (%)	Percentage Disease Index (PDI)*			Disease Reduction (%)		
		15th day	25th day	35th day	15th day	25th day	35th day
Metalaxyl 8% + Mancozeb 64% W.P.	0.25	0	0.20	0.12	100	99.65	99.04
Copper Sulphate + Amino Acid 12.5% S.C.	0.15	0.51	19.28	41.94	33.77	66.39	37.50
Kasugamycin 3% SL	0.20	0.48	26.39	54.40	37.66	54.00	18.93
Carbendazim 12% + Mancozeb 63% W.P.	0.15	0.21	3.55	3.73	72.72	93.81	94.44
Propineb 75% W.P.	0.30	0.21	1.09	1.92	84.41	98.10	97.14
Copper Oxychloride 50% W.P.	0.40	0.39	7.08	16.19	49.97	87.66	75.87
Hexaconazole 2% S.C.	0.15	0.49	51.56	64.17	36.36	10.13	4.37
Untreated Check	-	0.77	57.37	67.10	-	-	-

*Average of three locations

** Disease started appearing

Table 2 : Percentage stem rot incidence and disease reduction on different dates after fungicide application

Fungicides	Doses (%)	Stem rot incidence (%)*			Disease Reduction (%)		
		15th day	25th day	35th day	15th day	25th day	35th day
Metalaxyl 8% + Mancozeb 64% W.P.	0.25	25.00	8.30	2.30	28.57	86.64	96.97
Metalaxyl 68 W.G.	0.2	16.67	11.67	7.30	52.37	80.64	90.39
Propineb 75% W.P.	0.30	20.0	20.60	25.00	42.85	65.83	67.10
Copper Oxychloride 50% W.P.	0.40	20.0	20.60	13.30	42.85	65.83	82.50
Azoxystrobin 25 SC	0.10	15.0	13.30	9.0	57.14	77.94	88.16
Carbendazim 12% + Mancozeb 63% W.P.	0.15	38.3	21.6	20.0	-8.57	64.18	73.68
Untreated Check	-	35.0	60.3	76.0	-	-	-

*Average of three replications.

trict of West Bengal. A separate plot was maintained with plain water spray as control (untreated check).

Disease scores and percentage disease incidence were recorded at 8-10 days interval.

RESULTS AND DISCUSSION**Potato late blight**

Results in Table 1 reveal that out of seven fungicides, significantly high (99.94%) disease reduction was recorded in plants treated with Metalaxyl 8% + Mancozeb 64% W.P. on 35th day

Results in Table 2 indicate that 96.96% disease reduction was obtained in plants sprayed with 0.25% Metalaxyl 8% + Mancozeb 64% combination which was followed by the spray application of 0.2% Metalaxyl 68 W. G. (90.39%); 0.1% Azoxystrobin 25 S.C. (88.16%); 4.0% copper oxychloride 50% W.P. (82.5%) and 0.15% carbendazim 12% + Mancozeb 63% W.P. combination (73.68%).

It appears from the results of both the crops that 3-4 applications of Metalaxyl 8% + Mancozeb 64% W.P. @ 0.25% is most effective in controlling *Phytophthora* incited diseases of potato and pointed gourd. Superiority of Metalaxyl over copper fungi-

cide in controlling late blight of potato was observed and reported in the early work of the Mycology section, Govt. of West Bengal (Anonymous). Effect of Propineb 75% W.P. was though obtained higher in case of late blight disease control (Thind *et al.*, 2004) but it failed to show its superiority over copper oxychloride to control stem rot of pointed gourd.

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