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CHEMICAL CONTROL OF LEAF BLIGHT AND FRUIT ROT OF BRINJAL CAUSED BY *PHOMOPSIS VEXANS*

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Leaf blight and fruit rot of brinjal incited by *Phomopsis vexans* (Sacc. and Syd.) Harter is a serious disease of the crop affecting most of the verieties under cultivation in West Bengal. The results of the trials carried out on brinjal (cv. Pusa purple cluster) both *in vitro* and *in vivo* indicated the effectiveness of Bavistin, Rhizolex, Vitavax, Dithane M-45, and Blitox in controlling the diseases Bavistin showed maximum inhibition of mycelial growth at 31.25 ppm. In field trial also Bavistin at 0.1% was most effective in reducing the intensity of the diseases and increasing the yield over control irrespective of concentrations. This was followed by Rhizolex, Vitavax, Dithane M-45 and Blitox in a discending order of merit.

Key words : Leaf blight, Fruit Rot, Brinjal, *Phomopsis vexans*, Chemical control

INTRODUCTION

Leaf blight and fruit rot diseases of brinjal (*Solanum melongena* L.) incited by *Phomopsis vexans* (Sace. and Syd.) Harter has been reported from many parts of India (Rangaswamy, 1979) including West Bengal. The disease symptoms range from seedling blight to that of fruit rot. The first phase is a blight of young seedlings. The disease is, however, more prominent on the leaves. Brown, round to oval spots develop on the leaf becoming irregular as they enlarge. Affected leaves drop prematurely and the infected spot remains covered with numerous pycnidia. The fruit is attacked while on the plant, the decay being first soft and watery and later black and mummified as pycnidia develop abundantly over the surface.

Chemical control of the disease has been tried by several workers. Palo (1936) and Teo (1983) reported bordeaux mixture (4 : 4 : 50) and mixtures of copper oxychloride + benlate or copper oxychloride alone to give good control of the disease. Spraying of Captan (Singh and Chakraborty, 1982) and Dithane Z 78 (Grewal and Jhooty, 1987) reduced disease incidence affectively.

The present study envisaged to evaluate further the efficacy of different fungitoxicants including some new ones under field conditions foffowing screeing *in vitro*.

MATERIALS AND METHODS

Screening of fungicides in vitro :

The chemicals belonging to different groups were assayed by both Schmitz's (1930) 'Poisoned food technique' on potato dextrose agar and slide germination method of Montogomery and Moor (1938). In the first method 5 mm mycelial discs from the activaly growing region of 4 day-old-culture were cut by sterilized cork borer and placed in the centre of each petridishes containing fungicide ammended PDA including control (without fungicide) and diameter of the colony was measured after 4 days incubation at 28°C. In the 2nd method fungicide drops of different concentrations were pipetted separately in cavity slides and allowed to dry before the addition of spore suspension (35 spores per field) fortified with 0.5% host extract. The slides were incubated at 28°C in a most chamber for 24 h and percentage germination was recorded under low power of a microscope. The percentage inhibition of spore germination and mycelial growth of the fungus over control were plotted on log-probit scale and EDSO calculated. All treatments including control were suitably replicated.

The following fungicides were included in the paresent study.

Bavistin WP (50% Carbendazim), Vitavax 75 WP (75% Carboxin 5, 6-dihydro-2-methyl-1, 4-oxathin-3-Carboxanilide). Demosan 65 W (65% 1, 4-dichloro-2, 5-dimethoxy benzene), Rhizolex 50MP (50% 0.0 dimethy 1-0 (2, 6-dichloro-4-methyl-phenyl)-phosphorothioate). Captan 75 W (75 N-trichloromethylthio-4-cyclohexene-1, 2-dicarboximide) Flotaf 8OW (80% Captafol); Alleiate 8OWP (80% Fosetyl-AL), Emisan 6 (6% Methoxy ethyl mercury chloride), Blitox 50W (50% Copper oxychloride), Thiram 75% WDP (75% Tetramethyl thiuram disulphide), Ziride 80 WDP (80% Zinc dimethyl dithiocarbomate), Dithane M-45 (Zinc ion and manganese ethylene bisdithiocarbomate).

Screening of fungicides in vivo

One month old seedlings of brinjal (ev. Pusa purple cluster) raised in the nursery from the treated seeds (Thiram 3g/kg seed) were transplanted in the 1st week of March in a completely randomized block design in 4m×2.5m beds. The spray was initiated in the last week of July and subsequently 2 sprays were repeated at 15 days interval. The disease incidence was recorded at one day and 7 days after last spraying. The percent leaf area damaged by the disease was visually estimated by comparing the leaves with modified diagrams. Total area of the leaf was calculated by the leaf area meter and the diseased spots were drawn on tracing paper and finally by computing diseased spots on the graph paper actual percent diseased area were obtained. A scale with index values 0 to 9 was adopted for determining percent disease index. Net yield per plot was also recorded.

Following grade numbers were given to denote different percent leaf area infected. 0=no infection, 1=1%, 3=10%, 5=25%, 7=50%, 9=75%.

RESULTS AND DISCUSSION

The results of the *in-vitro* screening of fungicides have been presented in Tables 1 and 2. It would appear from the results (Table 1) that Bavistin was highly affective to inhibit mycelial growth of the pathogen completely at 31.25 ppm. The other fungicides equally affective were Ziride, Foltaf, Demosan and Rhizolex (ED 50 being <31.25 ppm.).

Table 1. *Effect of different concentrations of fungitoxicants on mycelial growth of* Phomopsis vexans.

Fungicides	Percent inhibition of growth over control*				
	31.25 ppm	62.5 ppm	125 ppm	250 ppm	ED 50
Bavistin	100	100	100	100	<31.25 ppm
Vitavax	18.45	30.36	44.76	47.02	>250 ppm
Demosan	77 85	86.31	87.98	88.57	<31.25 ppm
Rhizolex	77.86	78.09	79.76	79.88	<31.25 ppm
Foltaf	53.33	83.93	86.76	94.4	<31.25 ppm
Captan	47.26	48.21	53.33	62.14	69.18 ppm
Alleiate	0	1.19	1.78	2.38	>250 ppm
Thiram	49.88	52.38	67.98	90.24	37.15 ppm
Ziride	80.83	85.59	87.86	95.71	<31.25 ppm
Dithane M-45	19.16	26.55	31.55	36.19	>250 ppm
Blitox 50	10.48	14.4	27.98	42.86	>250 ppm
Emisan 6	8.57	9.28	25.0	72.62	165.96 ppm
Neem oil	17.74	20.83	21.31	23.21	>250 ppm
Citronella oil	24.28	26.19	26.55	27.97	>250 ppm

* An average of five replications

Table 2. *Effect of different concentration of fungitoxicants on spore germination of* Phomopsis vexans.

Fungicides	Percent inhibition of spore germination over control*				
	31.25 ppm	62.5 ppm	125 ppm	250 ppm	ED 50
Bavistin	3.48	3.64	3.85	5.23	>250 ppm
Vitavax	100	100	100	100	<31.25 ppm
Demosan	26.22	46.58	47.91	53.90	169.95 ppm
Rhizolex	18.15	19.43	20.98	22.43	>250 ppm
Foltaf	100	100	100	100	<31.25 ppm
Captan	100	100	100	100	<31.25 ppm
Thiram	100	100	100	100	<31.25 ppm
Ziride	95.72	100	100	100	<31.25 ppm
Dithane M-45	100	100	100	100	<31.25 ppm
Blitox 50	5.73	5.76	6.04	10.26	>250 ppm
Emisan 6	1.59	3.93	79.56	100	75.86 ppm

*An average of randomly 400 spore observations.

The pathogen was moderately sensitive to Thiram and Captan, the ED 50 being 37.15 ppm and 69.18 ppm respectively and poorly sensitive to Dithane M-45, Blitox, Vitavax, neem and citronella oils (ED 50>250 ppm). Besides, Alleiate had hardly any significant effect on the growth of the fungus.

Effect of fungicides on spore germination (Table 2) indicated that Vitavax, Dithane M-45, Foltan, Captaf, and Thiram were highly inhibitory to spore germination of *P. vexans* resulting in complete inhibition of spore germination at the lowest concentration assayed. This was sequentially followed by Ziride with 95.72% inhibition at 31 25 ppm. The ED 50 concentration of Emisan 6 and Demosan were 75.86 and 69.95 ppm respectively. It was interesting enough to observe that Bavistin and Rhizolex which were highly inhibitory to the mycelial growth of the fungus hardly had any significant effect on the spore germination,

Table 3. *Efficacy of different fungitoxicants against* Phomopsis *leaf blight and yield of brinjal under field condition*

Fungicides	Concn. of fungicide (in%)	Mean percent disease incidence 1987-88	88-89	Mean yield in qt/ha 1987-88	88-89
Bavistin	0.05	14.05*(22.06)**	18.15(25.18)	139.5	135.6
	0.1	14.0 (21.97)	15.73(23.34)	139.0	137.2
	0.25	11.26 (19.64)	15.76(23.42)	142.0	137 5
Vitavax	0 05	32.8 (34.94)	31.86(34.39)	123.8	123.03
	0.1	17.0 (24.35)	20.06(26.64)	125.0	123.2
	0.25	15.3 (23·03)	19.0 (25.84)	125.1	124.5
Rhizolex	0.2	20.46 (26.92)	22.93(28.59)	120.9	128 6
	0.35	16.16(123.73)	18.7 (25.62)	135.0	132.2
	0.5	13.4 (21.47)	16.73(24.12)	136.2	134.3
Dithane M-55	0.15	34.2 (35.79)	37.96(38.06)	123.4	120.9
	0.25	19.93 (26.49)	21.2 (27.42)	133.9	132.9
	0.35	19.4 (25.4)	21.8 (27.83)	135.2	131.6
Blitox 50	0.2	34.03 (35.67)	34.43(35.91)	117.0	116.9
	0.3	23.43 (28.93)	24.5 (29.67)	125.5	123.9
	0.5	20.26 (26.78)	23.0 (28.66)	125.3	124.7
Control (unsprayed)	—	36.03 (36.87)	40.53(39.52)	116.7	111.7
S. Em (±)		0.93	0.85	1.36	1.052
C.D. 5%		2.65	2.44	3.92	3.03
r Value		-0.807	—0.871		

*An average of three replications

*Figures in the parenthssis are angular transformation values

the ED 50 being over 250 ppm. However, this result is in conformity with the earlier observations made by Land and Dekkar (1972) who stated that the effects of fungicide on spore germination may differ significantly from its effect on the mycelial growth.

Under field condition, the fungicides tested, reduced leaf blight incidence significantly over control irrespective of their doses sprayed (Table 3) although the effect of individual fungicide varied among themselves.

Disease incidence was minimum in plots treated with Bavistin (14.06 and 18.15 PDI in 87-88 and 88-89 respectively) followed by Rhizolex, Vitavax, Dithane M-45 and Blitox 50 in order of merit. The fungicide treated plots also increased fruit yield significalty over control. A negative correlation of disease incidence and fruit yield indicated that the disease reduce fruit yield proportionately to the extent of infection.

It is evident from the present study that the foliar spray with Bavistin 0.1% can be recommended for effective control of the disease.

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