

Research Article

Management of chilli powdery mildew caused by *Leveillula taurica*

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ABSTRACT

Powdery mildew of chilli incited by *Leveillula taurica* was found to be a devastating disease of chilli. During the present study, six fungicides, two bioagents and one plant extract were evaluated under field conditions. Among fungicides, Bayleton, Bavistin, Topsin-M were the most effective in controlling chilli powdery mildew. The plot sprayed with *Trichoderma viride* showed minimum disease severity (28.70%) as compared to plot sprayed with *Pseudomonas fluorescens* (28.80%) Neem oil also reduced chilli powdery mildew disease in field.

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INTRODUCTION

Chilli (*Capsicum annuum*) is an important spice cum vegetable crop. India is the major producer consumer and exporter of chilli in world. India's share in total export of chilli in world is 4 per cent (Gupta and Naik, 2005).

Diseases are major limiting factor in crop production. Chilli crop suffers from several fungal bacterial and viral disease among all diseases, *Leveillula taurica* which causes powdery mildew is unique foliar pathogen having ability to infect large number of plants (Hirate, 1968). The disease has been reported to occur on chilli crop from several countries, like Hungary, USA, Italy, Israel, Romania, Bulgaria, India and elsewhere (Sah and Singh, 1988) Powdery mildew is prevalent in all the major chilli growing states of India. It has been reported to occur in serious proration in Vidrabha region (Gohokar and Peshney, 1981) and western Maharashtra (Pawar *et al.*, 1985) and now it is increasing importance in Marathwada region.

Powdery mildew caused by *Leveillula taurica* is one of the devastating diseases, of chilli that cause significant yield losses *i.e.* upto to 24 per cent (Sharmila *et al.*, 2004) considering the seriousness of disease the present studies, were undertaken to find an effective method for the management of disease either through bioagents, chemicals, botanicals.

MATERIALS AND METHODS

A field experiment was carried out at Department of

Horticulture, Marathwada Agriculture, University, Parbhani during *Kharif* and *Rabi* seasons 2007-08. The experiment was conducted in Randomised Block Design with three replications and ten treatments. The Variety Pusa Jwala was used to carry out the experiment. The plot size was 3x2.7m and transplanting of seedling was done with spacing 60x45cm. The recommended intercultural practices were undertaken as and when required.

The experiment was conducted with ten treatment out of these three were systemic fungicides. *i.e.* Bavistin (Carbendazim), Bayleton (Triadmierfon) and Tilt (Propiconazole). Three were non-systemic fungicides, Thiovit (wetable sulphur), Kavach (Cholrothalonil) and Topsin-M (Thiophanate Methyl) and also two bioagents *i.e.* *Trichoderma viride* and *Pseudomonas fluorescens*, with one plant extract *i.e.* neem oil. The spying schedule was under taken at the time of initiation of disease and further at time interval of 15 days from 135 DAT. The disease severity and incidence was recorded at 15 days interval after each spray. Disease severity of powdery mildew was recorded on lower, middle and upper leaves in 0 to 9 disease rating scale as suggested by Mayee and Datar (1986).

RESULTS AND DISCUSSION

Data presented in Table 1 and 2 indicate that disease severity and disease incidence in various treatments varied from 23.23 per cent to 26.47 per cent and 23.71 per cent to

29.67 per cent, respectively before spraying. It was also indicated that both disease incidence and severity in all the treatments was increased in all treatments after first spray. It was observed that after second and third spray, all fungicidal treatments had significantly reduced the disease incidence

and severity as compared to control. Significantly lowest disease severity after third spray was observed in plot sprayed with Bayleton (18.17%) followed by Bavistin, Topsin-M and all these treatments were at par with each other.

Among two bioagents *i.e.* *Trichoderma viride* and

Tr. No.	Treatments	Before spray	First spray	Second spray	Third spray
T ₁	Thiovit (Wettable sulphur 80 % WW) 0.3 %	23.92 (29.23)	36.32 (37.05)	28.62 (32.34)	23.03 (28.67)
T ₂	Topsin-M (70 WP) (Thiophanate methyl) 0.1 %	26.47 (30.95)	36.39 (37.10)	29.18 (32.68)	20.97 (27.25)
T ₃	Kavach (Chlorothalonil 75 % WP) 0.2 %	25.50 (30.33)	37.39 (37.57)	30.93 (33.78)	25.53 (30.34)
T ₄	Bavistin (Carbendazim 50% WP) 0.1 %	24.58 (29.71)	36.97 (37.44)	27.92 (31.88)	19.49 (26.19)
T ₅	<i>Pseudomonas fluorescens</i> @ 10 g/lit of water	23.23 (28.77)	36.85 (37.57)	34.39 (35.90)	28.80 (32.45)
T ₆	Tilt (Propiconazole 25 % EC) 0.1 %	26.25 (30.80)	36.76 (37.19)	29.75 (33.05)	23.36 (28.90)
T ₇	Bayleton (Triadimefon 25 % WP) 0.05 %	24.25 (29.49)	34.95 (36.23)	25.75 (30.48)	18.17 (25.52)
T ₈	Neem oil (Azadirachtin 0.03 % EC) 1 %	25.06 (30.03)	37.52 (37.16)	32.17 (34.54)	26.65 (31.08)
T ₉	<i>Trichoderma viride</i> @ 5 g/lit of water	24.87 (29.91)	36.94 (37.42)	32.09 (34.50)	28.70 (32.38)
T ₁₀	Control (water spray)	25.87 (30.62)	42.11 (40.45)	48.63 (44.20)	61.64 (51.72)
	S.E. ±	0.84	0.41	0.35	0.37
	C.D. (P=0.05)	2.50	1.24	1.04	0.91

Tr. No.	Treatments	Before spray	First spray	Second spray	Third spray
T ₁	Thiovit (Wettable sulphur 80 % WW) 0.3 %	29.67 (32.96)	41.11 (39.87)	36.33 (37.05)	27.77 (31.79)
T ₂	Topsin-M (70 WP) (Thiophanate methyl) 0.1 %	26.00 (30.62)	42.18 (40.49)	31.00 (33.82)	25.55 (23.64)
T ₃	Kavach (Chlorothalonil 75 % WP) 0.2 %	24.19 (29.45)	45.39 (42.34)	38.88 (38.57)	28.19 (32.69)
T ₄	Bavistin (Carbendazim 50% WP) 0.1 %	24.44 (29.57)	47.77 (43.71)	32.34 (34.65)	24.00 (29.86)
T ₅	<i>Pseudomonas fluorescens</i> @ 10 g/lit of water	23.71 (29.09)	49.42 (44.66)	45.55 (42.44)	33.66 (35.42)
T ₆	Tilt (Propiconazole 25 % EC) 0.1 %	28.37 (32.17)	49.99 (44.49)	38.97 (38.62)	27.08 (32.62)
T ₇	Bayleton (Triadimefon 25 % WP) 0.05 %	26.66 (31.05)	37.77 (44.99)	30.00 (33.20)	22.48 (28.28)
T ₈	Neem oil (Azadirachtin 0.03 % EC) 1 %	24.59 (29.71)	47.39 (37.91)	39.66 (39.03)	30.49 (34.12)
T ₉	<i>Trichoderma viride</i> @ 5 g/lit of water	26.41 (30.92)	48.29 (43.49)	37.33 (37.64)	34.48 (35.95)
T ₁₀	Control (water spray)	26.49 (30.95)	61.10 (44.01)	52.22 (46.26)	64.44 (53.39)
	S.E. ±	1.16	1.18	0.65	2.49
	C.D. (P=0.05)	3.47	3.52	1.93	7.41

Tr. No.	Fungicides	Observations after spraying			Total reduction / increase over first observation
		First	Second	Third	
T ₁	Thiovit (Wettable sulphur 80 % WW) 0.3 %	+12.4	-7.7	-5.59	-0.89
T ₂	Topsin-M (70 WP) (Thiophanate methyl) 0.1 %	+9.92	-7.21	-8.21	-5.5
T ₃	Kavach (Chlorothalonil 75 % WP) 0.2 %	+11.84	-6.46	-5.4	-0.02
T ₄	Bavistin (Carbendazim 50% WP) 0.1 %	+12.39	-9.05	-8.43	-5.09
T ₅	<i>Pseudomonas fluorescens</i> @ 10 g/lit of water	+13.62	-2.46	-5.59	+5.57
T ₆	Tilt (Propiconazole 25 % EC) 0.1 %	+10.51	-7.01	-6.39	-2.89
T ₇	Bayleton (Triadimefon 25 % WP) 0.05 %	+10.7	-9.2	-7.58	-6.08
T ₈	Neem oil (Azadirachtin 0.03 % EC) 1 %	+12.46	-5.35	-5.52	+1.59
T ₉	<i>Trichoderma viride</i> @ 5 g/lit of water	+12.07	-4.85	-3.39	+3.83
T ₁₀	Control (water spray)	+16.24	+6.52	+13.01	+33.77

+ Increase - Decrease

Table 4 : Mean per cent increase / decrease of powdery mildew incidence as compared to preceding observations in respective fungicides

Tr. No.	Fungicides	Observations after spraying			Total reduction / increase over first observation
		First	Second	Third	
T ₁	Thiovit (Wettable sulphur 80 % WW) 0.3 %	+11.44	-4.78	-8.56	-1.9
T ₂	Topsin-M (70 WP) (Thiophanate methyl) 0.1 %	+16.18	-11.28	-5.45	-0.55
T ₃	Kavach (Chlorothalonil 75 % WP) 0.2 %	+21.2	-6.51	-9.69	-1.0
T ₄	Bavistin (Carbendazim 50% WP) 0.1 %	+23.33	-15.43	-7.52	-0.44
T ₅	<i>Pseudomonas fluorescens</i> @ 10 g/lit of water	+25.71	-3.87	-11.95	+9.89
T ₆	Tilt (Propiconazole 25 % EC) 0.1 %	+21.62	-11.02	-9.89	-1.29
T ₇	Bayleton (Triadimefon 25 % WP) 0.05 %	+11.11	-7.77	-7.52	-4.18
T ₈	Neem oil (Azadirachtin 0.03 % EC) 1 %	+22.8	-7.73	-8.17	+5.9
T ₉	<i>Trichoderma viride</i> @ 5 g/lit of water	+21.88	-10.96	-2.85	+8.07
T ₁₀	Control (water spray)	+34.61	+1.12	+2.22	+37.95

+ Increase

- Decrease

Pseudomonas fluorescens after third spray, plot with *Trichoderma viride* treatment showed minimum severity (28.70%) as compared to plot with *Pseudomonas fluorescens* treatment (28.80%). Both the bioagents were at par with each other, where as botanical neem oil gave good results as compared to bioagents. It showed 26.65 per cent disease severity after third spray.

Table 3 and 4 indicate that among all the treatments maximum disease control was observed in treatment of Bayleton (Tridemefon) followed by Thiovet, Tossin-M and Bavistin. Both bioagents, *Trichoderma viride* and *Pseudomonas fluorescens* reduces powdery mildew disease as compared to control and it was observed that *Trichoderma viride* was more effective than *Pseudomonas florescence*. Botanical neem oil also reduced powdery mildew disease in field.

Several workers in past have tried to find out effective control against chilli powdery mildew and the present results are in agreement with Palti (1959), Pucci (1962) and Pawar *et al.* (1985). Similarly efficacy of Tridemefon has been reported by Patil (1990) and Hingole (1999) which is also in agreement with present findings. Similarly efficacy of *Trichoderma viride* has been reported against *Leveillula taurica* by Deore and Sawant (2006). Where as effectiveness of neem oil in controlling okra powdery mildew was previously reported by Ragupati *et al.* (1994).

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