

Efficacy of different fungicides for management of powdery mildew of mango in West Bengal

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Seven fungicides at different concentrations were tested for their efficacy in reducing the powdery mildew of mango under field condition. Two years experimentation (2000-2002) on susceptible cultivar "Himsagar" at bearing plants showed that all the fungicides reduced the disease significantly when applied at pre-bloom, 10 days after 1st spray and at fruit setting stage over untreated control. Results revealed that triadimefon showed minimum disease severity (2.87%) followed by dinocap (4.10% & 5.76%) and penconazole (7.29%) when applied at a concentration of 0.1%, 0.1% 0.05% and 0.05% respectively and their differences in reduction in disease severity were not statistically significant. Reduction in disease severity also increased the average number of fruits per branch from 448.75% to 1142.08% over untreated control by application of different fungicides.

Key words : Mango, powdery mildew, *Oidium mangiferae*, fungicides, management, fruit yield.

INTRODUCTION

Powdery mildew caused by *Oidium mangiferae* Berthet is one of the serious disease of mango (*Mangifera indica* L.) is observed in almost all the cultivars and it about 30-90% loss in yield (Prakash and Srivastava, 1987). The disease is reported in all the mango growing states mainly in Maharashtra, Hyderabad, Karnataka and Uttar Pradesh, (Vaheeduddin, 1953 ; Venkataraman, 1956 ; D-I. J., 1964). The disease is found to occur at different severity levels depending on the climatological conditions (Prakash and Srivastava, 1987). In West Bengal conditions the severity of this disease is about 3.33-57.16% in different cultivars (Anon, 2002). Though different management schedules have been recommended for the control of powdery mildew in different states but no such work has been reported from West Bengal. In such situation, an attempt has been made to evaluate the efficacy of seven fungicides at different concentrations through a specific spraying schedule for reducing the powdery mildew under West Bengal conditions.

MATERIALS AND METHODS

The experiment was conducted at Horticulture

Research Station, Mondouri, B.C.K.V., Nadia during 2001-2002 on grown up susceptible cv. Himsagar. Seven fungicides with twelve treatments viz. T₁-carbendazim (Bavistin 50 WP) @ 1g/L, T₂-dinocap (karathane 48 EC) @ 0.5 ml/L, T₃-dinocap @ 0.75 ml/L, T₄-Dinocap @ 1 ml/L, T₅- wetable sulphur (Sulfex 80 WP) @ 2.5 g/L, T₆-triadimefon (Bayletan 25% WP) @ 0.5 g/L, T₇- triadimefon @ 1g/L, T₈-carbendazim 12% + mancozeb 63% (Companion) @ 2g/L, T₉-companion@2.5g/L, T₁₀-thiophanate methyl (Roko 70% WP) @ 1g/L, T₁₁-penconazole (Topas 10% EC) @ 0.5 ml/L and T₁₂-control (water spray) were evaluated following Randomized Block Design (RBD) with four replications. The first spraying was done at pre-bloom stage @ 12-15 liters per plant with the help of foot sprayer and subsequent two other sprays were at 10 days after first spray, and at fruit setting stage respectively. Four branches in each geographical directions (N-E-W-S) were marked for recording disease severity (PDI) following 0-5 scale for each plant. The plants were regularly treated with Carbaryl (0.15%) for control of hoppers. The pre cent Disease Index (PDI) was calculated by using the formula :

$$PDI = \frac{\sum \text{Individual disease rating of each panicle/plant}}{\text{No. of panicle observed/plant} \times \text{max. disease severity scale}} \times 100$$

The disease control (DC%) and per cent increase in yield over control was calculated as suggested by Das and Raj (1995). The mean number of fruits per branch were obtained by counting the total number of intact mature fruits of the selected plants. The observations for disease severity were recorded 10 days after the last spraying.

RESULTS AND DISCUSSION

It is evident from the two years (2001-2002) pooled mean data that all the treatments significantly reduced the disease severity over control (Table 1). The minimum disease severity was observed in the plants treated with triadimefon 2.87% @ 0.1% concentration followed by dinocap 4.10% @ 0.1%, dinocap 5.76% @ 0.075% and penconazole 7.29% @ 0.05% conc. respectively, but the differences in

disease severity was not statistically significant among themselves. Maximum disease severity in treatment thiophanate methyl 23.32% @ 0.1% showed statistically significant differences with plants treated with carbendazim 13.24% @ 0.1% and companion 15.45% @ 0.2% respectively. There was no significant differences in reducing disease severity in the plants treated with dinocap at three different concentrations (0.05%, 0.075% & 0.1%), triadimefon (0.1%) and penconazole (0.05%), where as triadimefon at two concentrations showed significant difference in reducing disease severity (Table 1). Triadimefon 2.87% @ 0.1% conc. showed statistically significant differences in reducing disease severity to the plants threated with carbendazim, wetable sulphur, two concentration of companion and thiophanate mythyl where as companion and carbendazim alone also showed no significant difference in reducing the disease severity (Table 1).

Table 1 : Efficacy of different fungicides against powdery mildew of mango

Treatments	Dose (%)	Percent disease index (PDI) of Powdery Mildew				*Mean no. of fruits/branch			
		2001	2002	Pooled Disease Control (Mean)	Disease Control (%) (Pooled)	2001	2002	Pooled (Mean)	% increase in yield over control (Pooled)
T ₁ -Carbendazim (Bavistin 50 WP)	0.1	16.77 (23.90)*	9.70 (17.92)	13.24 (21.08)	69.73	19.25	22.75	21.00	975.41
T ₂ -Dinocap (Karnathane 48 EC)	0.05	10.38 (18.66)	6.00 (14.08)	8.19 (16.51)	80.96	21.75	19.00	20.37	929.58
T ₃ -Dinocap (Karathane 48 EC)	0.075	7.52 (15.47)	4.00 (10.99)	5.76 (13.42)	85.65	26.50	17.75	22.13	977.50
T ₄ -Dinocap (Karnathane 48 EC)	0.1	5.40 (13.33)	2.80 (9.50)	4.10 (11.59)	90.79	27.75	14.25	21.00	1052.50
T ₅ -Wetable sulphur (Sulfex 80 WP)	0.25	23.51 (28.77)	13.60 (21.43)	18.56 (25.29)	57.41	14.00	14.50	14.25	647.50
T ₆ -Triadimefon (Bayletan 25 WP)	0.05	8.94 (17.32)	5.75 (13.82)	7.35 (15.66)	82.80	25.25	13.25	19.25	890.41
T ₇ -Triadimefon (Bayletan 25 WP)	0.1	3.54 (10.56)	2.20 (8.44)	2.87 (9.57)	93.13	33.50	15.00	24.25	1142.08
T ₈ -Carbendazim 12% + Mancozeb 63% (Companion)	0.2	19.49 (26.01)	11.40 (19.58)	15.45 (19.07)	63.52	15.50	13.75	14.13	545.41
T ₉ -Carbendazim 12% Mancozeb 63% (Companion)	0.25	13.84 (21.59)	8.00 (16.23)	10.92 (19.07)	75.47	22.75	10.50	16.63	713.33
T ₁₀ -Thiophanate methyl (Roko 70 WP)	0.1	28.89 (32.46)	17.75 (24.87)	23.32 (28.83)	46.69	9.25	11.50	10.37	448.75
T ₁₁ -Penconazole (Topas 10% EC)	0.05	8.99 (17.39)	5.58 (13.65)	7.29 (15.65)	83.19	24.00	8.25	16.12	719.58
T ₁₂ -Control (Water spray)	—	57.09 (49.27)	34.37 (35.75)	45.73 (42.50)	—	3.75	3.50	3.63	—
Sem		2.25	1.56	1.80	3.90	3.48	2.6	2.05	118.37
CD at 5%		6.47	4.51	5.19	11.25	10.03	7.60	5.91	341.82
L.S.D. (0.05%)	2.9	271.0	9.8	260.3	1.0	ns			
C.V.(%)	6.1	3.8	13.0	23.7	2.6	24.8			

* Average of 4 branches/tree

** Figures in parentheses are angular transformed values.

All the treatment reducing more than 50% disease in the treated plants except thiophanate methyl (46.69%) over untreated control, (Table 1). The maximum disease was reduced in the plants treated with triadimefon 93.13% @ 0.1% followed by dinocap 90.79% @ 0.1% which showed no statistical significant difference among themselves. There was also no significant difference among the treatments of dinocap (0.075%), triadimefon (0.05%), penconazole (0.05%), and dinocap (0.05%) for reducing the disease.

Two years (2001-2002) pooled mean data revealed that triadimefon @ 0.1% gave maximum fruit yield (24.25) followed by dinocap (22.13 & 21.00) at two different concentration @ 0.1% and 0.075% respectively and carbendazim (21.00) @ 0.1% over untreated control. All the treatments were statistically significant over control. Except the plants treated with thiophanate methyl and wetable sulphur, all the treatments had no statistical significant differences among themselves (Table 1).

Per cent increase in yield over control were also subsequently significant in all treatments. Triadimefon showed maximum increase in yield (1142.08% at 0.1% concentration followed by dinocap 1052.50% and 977.50% at 0.1 and 0.075% concentration respectively and carbendazim 975.41 at 0.1% concentration when sprays were given at pre-bloom, 10 days after 1st spraying and at fruit setting stage. Minimum per cent increase in yield over control was obtained in plants treated with thiophanate methyl (448.75) followed by companion (545.41%) @ 0.2% concentration and wetable sulphur (647.50%). There was no significant differences in increase per cent of yield over control among the plants treated with carbendazim, three concentration of dinocap and two concentrations of triadimefon application.

This results confirms the reports of Verma and Kaur (1998) and Desai (1998) as both the experiments concluded the triadimefon was the excellent fungicide for the control of powdery mildew of mango. It was also observed that there was a markedly enhanced reproductive potential of the tree which ultimately increase the yield and reduced

the disease severity (Verma and Kaur, 1998). However, the results of this experiment contradict the reports of Sharma (1992) where he reported that carbendazim (0.1%) was highly effective in controlling powdery mildew in Himachal Pradesh followed by triadimefon (0.05%) and dinocap was ineffective.

It was concluded that triadimefon, dinocap and carbendazim sprays gave better protection against powdery mildew as well increased the yield potential over untreated control when first two sprays were applied in a narrow gap of 10 days and third sprays were applied at fruit setting stage. Among the three, triadimefon exhibited best performance. Such result is probably due to narrowing the gap between first two successive sprays which might have primarily checked the multiplication rate of conidia where as third spray of fruit setting stage protects the pin-head like fruits from further attack of pathogen which have ultimately increased retention of fruits in trees (Verma and Kaur, 1998).

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(Accepted for publication May 28 2003)