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Fungicides for the Management of Grey Leaf Blight (*Pestalotia Anacardii*) of Mango

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Abstract

In the present study, seven fungicides and their combinations were evaluated against the grey leaf blight disease of mango. Minimum disease intensity (%) and maximum disease control (%) was achieved with the spray of carbendazim+mancozeb (0.2 % @ 2.0 g l⁻¹) and kresoxim methyl (0.1 % @ 1.0 ml l⁻¹) against grey leaf blight disease of mango. Carbendazim 12%+mancozeb 63% was found significantly superior over rest of the treatments with minimum grey leaf blight intensity (8.07 %) followed by kresoxim methyl 43% SC (10.67%). Copper oxychloride 50% WP was found to be the next best treatment in order of effectiveness which was at par with cymoxanil 8%+mancozeb 64 % (12.74 %).

Keywords: Fungicides, mango, *Pestalotia anacardii*

1. Introduction

Mango (*Mangifera indica* L.), an important fruit crop belongs to family Anacardiaceae and is believed to be originated within a large area including north-western Myanmar, Bangladesh and north-eastern India. Mango is also the national fruit of India, which is the largest producer of mango in the world accounting for 52-63% of total production. The genus, *Mangifera* comprises of 41 species (Mukherjee, 1985), however total reported species now stands at 39 (Mukherjee and Stolon, 1989). All the edible cultivars of mango represent the species *indica* which originated in the Indian sub-continent. Looking to the seriousness of the disease and economic importance of the crop in this area, present investigations were undertaken to study the efficacy of fungicides against disease and to generate necessary information for suitable chemical management measures to minimize crop losses.

2. Materials and Methods

A field experiment was conducted for two years to know the effect of different fungicides under *in vivo* condition. A susceptible cv. Kesar was used for the study at Agricultural Experimental Station Paria NAU, Navsari. Treatments with seven fungicides *i.e.* three systemic, two non systemic and two combination fungicides (Table 1) with one check were laid

out in Randomized Block Design (RBD). Each treatment was replicated thrice. Three sprays were undertaken. First spray was given at the initiation of the disease followed by second and third spray at a monthly interval in the same orchard of cv. Kesar having 8 years old tree severely affected by grey leaf blight disease. The disease intensity (%) was calculated at one day before each spray and 7 and 15 days after first, second and third spray. The data were analyzed as per randomized block design for interpretation and the disease control (%) was also worked out.

Formula for calculating disease intensity (%):

PDI = $(\sum \text{Ratings of infected leaves observed} / \text{No. of leaves observed} \times \text{Maximum disease score}) \times 100$

Observations with regards to symptoms were recorded on the basis of graded scale (0-5) (Patel, 1988):

Scale	Description
0	Completely healthy – No spots
1	1 to 10% area of leaf infected
2	11 to 25% area of leaf infected
3	26 to 50% area of leaf infected
4	51 to 75% area of leaf infected
5	More than 75% area of leaf infected and defoliation

Table 1: Fungicides used during the study and their concentration used

Tr. no.	Treatment Details	Quantity
T ₁	Carbendazim 50% WP	0.5 g l ⁻¹
T ₂	Thiophanate methyl 70% WP	1.0 g l ⁻¹
T ₃	Kresoxim methyl 43% SC	1.0 ml l ⁻¹
T ₄	Copper oxychloride 50% WP	2.0 g l ⁻¹
T ₅	Copper hydroxide 77% WP	2.5 g l ⁻¹
T ₆	Carbendazim 12% WP+mancozeb 63% WP	2.0 g l ⁻¹
T ₇	Cymoxanil 8%+mancozeb 64% WP	2.0 g l ⁻¹
T ₈	Control	-

3. Results and Discussion

From the perusal of data presented in Table 2, it is clear that all the treatments significantly reduced the grey leaf blight intensity as compared to control. During the first year, carbendazim 12%+mancozeb 63% was found significantly superior over rest of the treatments with minimum grey leaf blight intensity (7.23%) followed by kresoxim methyl 43% SC (10.12%) which was at par with cymoxanil 8%+mancozeb 64% (11.24%). The next best treatment with lowest disease intensity was copper oxychloride 50% WP (12.21%) followed by carbendazim 50% WP (16.21%) which was at par with thiophanate methyl 70% WP (17.14%) and was followed by copper hydroxide 77% WP (21.12%). In case of control, highest disease intensity (51.23%) was recorded.

Maximum disease control (85.89%) was observed in carbendazim 12%+mancozeb 63% which was followed in decreasing order by kresoxim methyl 43% SC (80.25 %), cymoxanil 8%+mancozeb 64 % (78.06%), copper oxychloride

50 % WP (76.17%), carbendazim 50% WP (68.36%) and thiophanate methyl 70% WP (66.54%) whereas, copper hydroxide 77% WP had minimum disease control (58.77%) during the first year of study.

In the second year, carbendazim 12%+mancozeb 63% was found significantly superior over rest of the treatments with minimum grey leaf blight intensity (8.91%) followed by kresoxim methyl 43% SC (11.21%) which was at par with copper oxychloride 50% WP (12.23%). The next best treatment in recording lowest disease intensity was cymoxanil 8%+mancozeb 64% (14.23%) and carbendazim 50% WP (14.23 %) followed by thiophanate methyl 70% WP (16.23%) and copper hydroxide 77% WP (17.84%). In case of control, highest disease intensity (41.23%) was recorded.

During second year of study, maximum disease control (78.39%) was observed in carbendazim 12%+mancozeb 63%, which was followed in decreasing order by kresoxim methyl 43% SC (72.81%), copper oxychloride 50 % WP (70.33%), cymoxanil 8%+mancozeb 64%, carbendazim 50% WP (65.48%) and thiophanate methyl 70 % WP (60.63%) whereas, minimum disease control (56.73%) was recorded in copper hydroxide 77% WP.

The pooled data for both the years indicated that among all the treatments, carbendazim 12%+mancozeb 63% was found significantly superior over rest of the treatments with minimum grey leaf blight intensity (8.07%) followed by kresoxim methyl 43% SC (10.67%). The treatment copper oxychloride 50% WP (12.22%) was found to be the next best treatment in order of effectiveness which was at par with cymoxanil 8%+mancozeb 64% (12.74%). The treatment carbendazim 50% WP (15.22%) was found to be superior over the treatment thiophanate methyl 70% WP (16.69%). The next best treatment in order of merit was copper hydroxide 77%

Table 2: Efficacy of fungicides against grey leaf blight disease of mango cv. Kesari

Tr. No.	Dose	I -Year		II -Year		Pooled	
		Disease intensity (%)	Disease control (%)	Disease intensity (%)	Disease control (%)	Disease intensity (%)	Disease control (%)
T ₁	0.5 g l ⁻¹	23.71* (16.21)**	68.36	22.12* (14.23)**	65.48	22.92* (15.22)**	67.08
T ₂	1.0 g l ⁻¹	24.44 (17.14)	66.54	23.74 (16.23)	60.63	24.10 (16.69)	63.91
T ₃	1.0 ml l ⁻¹	18.52 (10.12)	80.25	19.53 (11.21)	72.81	19.00 (10.67)	76.93
T ₄	2.0 g l ⁻¹	20.43 (12.21)	76.17	20.45 (12.23)	70.33	20.45 (12.22)	73.57
T ₅	2.5 g l ⁻¹	27.35 (21.12)	58.77	24.97 (17.84)	56.73	26.18 (19.48)	57.86
T ₆	2.0 g l ⁻¹	15.58 (7.23)	85.89	17.35 (8.91)	78.39	16.49 (8.07)	82.54
T ₇	2.0 g l ⁻¹	19.57 (11.24)	78.06	22.12 (14.23)	65.48	20.87(12.74)	72.45
T ₈	-	45.69 (51.23)	0.00	39.93 (41.23)	0.00	42.82 (46.23)	0.00
SEm±		0.48		0.36		0.34	
CD (p=0.05)		1.46		1.10		1.04	
C.V. %		7.38		6.61		6.44	

*: Figures indicate arc sin transformed values; **: Figures in parenthesis are original values



WP (19.48%). In control, highest disease intensity (46.23%) was recorded.

Maximum disease control (82.54%) was observed in carbendazim 12%+mancozeb 63% which was followed in decreasing order by kresoxim methyl 43% SC (76.93%), copper oxychloride 50% WP (73.57%), cymoxanil 8%+mancozeb 64% (72.45%), carbendazim 50% WP (67.08%) and thiophanate methyl 70% WP (63.91%) whereas, copper hydroxide 77% WP had minimum disease control of 57.86%.

Similar results were reported previously for bioefficacy of fungicides under field condition by Chauhan (1984) who reported that carbendazim (0.3%) at pea stage before maturation of stone reduced the incidence of grey leaf blight disease of mango. Later on, Karthikeyan et al. (2002) reported that thiophanate methyl and carbendazim at 2.0% application in coconut were found best in reduction of the grey leaf blight disease index to 18.6 and 20.9%, respectively after three years of application. Kyada (2006) observed that among systemic, non-systemic and combination of fungicides, carbendazim+mancozeb (0.1%) was the best to reduce grey leaf blight disease with 69.30% reduction followed by carbendazim (0.05%) and iprodione+carbendazim (0.025%) tested *in vivo*. These results are in confirmation with earlier workers. Das and Mahanta (1985), as well as Patel (1988) reported Bavistin effective against the growth of *P. palmarum* and *P. mangiferae*, respectively. Khalequzaman et al. (2003) observed that among six fungicides, Bavistin 50% WP (carbendazim) 0.1% found better in controlling leaf spot of sapota caused by *Pestalotia sapotae*. Bavistin 50% WP (carbendazim), copper oxychloride and carbendazim 12%+mancozeb 63% were completely inhibitory to *Pestalotiopsis* sp. (Pandey et al., 2006; Rokade, 2009).

4. Conclusion

Among all the fungicides tested *in vivo* against grey leaf blight of mango, carbendazim 12%+mancozeb 63% (0.2% @ 2.0 g l⁻¹) was found significantly superior with minimum grey leaf blight intensity followed by kresoxim methyl 43% SC (0.1% @ 1.0 ml l⁻¹). Copper oxychloride 50% WP (0.2% @ 2.0 g l⁻¹) was found to be the next best treatment in order of effectiveness which was at par with cymoxanil 8%+mancozeb 64% (0.2% @ 2.0 g l⁻¹).

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