



Research Article

CHEMICAL CONTROL OF POWDERY MILDEW OF MANGO

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Abstract: Most of commercially popular cultivars of mango are susceptible to the powdery mildew disease. White powdery growth is appearance on flowers and pea size fruits, which leading to dropping of flowers and pea size fruits cause serious fruit yield losses to the mango growers. Evaluation of different fungicides along with recommended for reduced loss due to powdery mildew. All tested fungicides were found significantly reduced disease incidence. The minimum disease intensity (6.98%) was recorded in propiconazole (0.025%) followed by difenoconazole (0.025%) and hexaconazole (0.005%), their disease intensity was reported 7.91% and 8.63%, respectively. Significantly highest fruit yield (4001 kg/h) was obtained in propiconazole (0.025%) followed by hexaconazole (0.005%) and difenoconazole (0.025%) with fruit yield of 3858 kg/h and 3758 kg/h, respectively. Maximum net return (Rs.26985/h) with ICBR (1:8.75) was obtained in propiconazole but hexaconazole gave highest ICBR (1:14.57).

Keywords: Powdery mildew, *Oidium mangiferae*, Fungicides, Chemicals

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Introduction

India is the world's largest producer shares around 56 per cent of total global production. Mango is affected by number of fungal pathogens, among them; powdery mildew is the most destructive disease resulting in substantial yield loss. The crop is regularly suffered from many diseases, among them powdery mildew (*Oidium mangiferae*) is one of the devastating diseases affecting most of cultivars, causing 20 to 90 percent yield loss. Mango cv. Kesar is susceptible to powdery mildew disease. The powdery mildew fungus produces white superficial powdery growth on inflorescence, young leaves and developing young fruits. The disease mainly attacks on inflorescence resulting in shedding of flowers and young fruits, thus causing heavy losses to the mango growers [1]. Triazole fungicides having systemic and curative effect for fungal pathogen. Triazole molecules are found effective against powdery mildew disease in other crops. Keeping this view, the present investigation has been carried out to evaluate the efficacy of previous recommended fungicides with triazoles fungicides against powdery mildew of mango.

Materials and Methods

Three years field experiments during 2007, 2008 and 2009 were conducted at farmers field at Bagdu village of Junagadh district. Kesar mango cultivar is mostly planting by farmers. Powdery mildew is common disease occurs regularly at the time of flowering, when favourable climatic conditions are available at that time cause huge loss. Hence triazole fungicides were tested against powdery mildew disease of mango. Experiments were conducted at randomized block design with four replications keeping single tree per replication and three consequent fruiting seasons during 2006, 2007 and 2008. All recommended practices were followed during experimental period except general fungicides sprays we adopted to harvest good crop. Seven fungicides viz. carbendazim (0.05%), wettable sulphur (0.20%), dinocap (0.048%), propiconazole (0.025%), hexaconazole (0.005%), difenoconazole (0.025%) and tridemorph (0.04%) were tested along with control. Three sprays of fungicides were done at 20 days interval starting from initiation of powdery mildew disease in mango during flowering period.

Powdery mildew disease intensity was recorded after 10 days of last sprays. Fruit yield of each tree was recorded and statically analysis data. The per cent diseases intensity was recorded by using 0-5 grade. Where 0= no disease, 1=1-20%, 2=21-40%, 3= 41-60%, 4= 61-80% and 5= 81-100%) inflorescence by powdery mildew [2].

$PDI = \frac{[(\text{Sum of all grade}) / (\text{No. of observations} \times \text{Maximum grade})] \times 100}{1}$

Result and Discussion

The data presented in [Table-1] revealed that all fungicides were found significantly reduced powdery mildew disease. The lowest disease intensity (6.98%) was recorded in propiconazole (0.025%) followed by difenoconazole (0.025%) and hexaconazole (0.005%), their disease intensity was reported 7.91% and 8.63%, respectively. Carbendazim, dinocap, tridemorph and sulphur were reported less than 25% diseases intensity. Maximum powdery mildew disease intensity was recorded in control (64.98%). All fungicides were found significantly superior on fruit yield than control [Table-2]. Significantly highest fruit yield (4001 kg/h) was obtained in propiconazole (0.025%) followed by hexaconazole (0.005%) and difenoconazole (0.025%) with fruit yield of 3858 kg/h and 3758 kg/h, respectively. Looking to the economic in [Table-3] of various treatments maximum net return of Rs.26985/h with ICBR (1:8.75) was obtained in propiconazole. The treatment of hexaconazole was second in net return (Rs.26880/h) with highest ICBR (1:14.57). Similar result obtains triazole fungicides viz. hexaconazole, triadimefon and penconazole at 0.05% were found minimum powdery mildew disease in mango as compare to benomyl (0.10%), denocap (0.10%) and wettable sulphur (0.25%) [3]. Triadimefon, dinocap, sulphur and carbendazim were found effective fungicides for control of powdery mildew of mango [4]. Effectiveness of triadimefon, cyproconazole and flusilazole were found better control of powdery mildew of mango [5]. Mango powdery mildew was effectively control through three sprays of Score 250EC (Difenoconazole) @0.4g/l or Anpower 5ME (Hexaconazole) @0.3ml/l at 15 days interval were found effective fungicides in reducing disease incidence by 93.28 and 86.87 per cent, respectively [6].

Table-1 Effect of fungicides on incidence of mango powdery mildew (Pooled)

Treatment	Percent disease intensity			
	2006-07	2007-08	2008-09	Pooled
Carbendazim (0.05%)	25.10 (17.99) *	23.17 (15.48)	24.50 (16.61)	24.11 (16.68)
Wettable Sulphur (0.20%)	29.56 (24.34)	28.22 (22.36)	27.56 (21.42)	28.45 (22.69)
Dinocap (0.048%)	26.14 (19.41)	24.76 (17.54)	25.16 (18.08)	25.36 (18.34)
Propiconazole (0.025%)	15.89 (7.58)	14.59 (6.34)	15.45 (7.10)	15.31 (6.98)
Hexaconazole (0.005%)	18.64 (10.22)	15.48 (7.12)	17.12 (8.67)	17.08 (8.63)
Difenoconazole (0.025%)	16.52(8.09)	16.06 (7.65)	16.42(8.00)	16.34 (7.91)
Tridemorph (0.04%)	27.50 (21.32)	25.73 (18.85)	26.29 (19.62)	26.51 (19.92)
Control	54.60 (66.44)	57.15 (70.18)	49.41 (57.67)	53.72 (64.98)
SEm±	2.36	2.00	1.98	1.00
C. D. at 5%	6.94	5.18	5.84	3.00
C. V. (%)	17.65	13.33	17.02	16.15
Y x T				
SEm±	-	-	-	2.00
C. D. at 5%	-	-	-	NS

Table-2 Effect of fungicides on fruit yield of mango (Pooled)

Treatment	Mango fruit yield (kg/h)			
	2007	2008	2009	Pooled yield (kg/h)
Carbendazim (0.05%)	2850	3025	2675	2850
Wettable Sulphur (0.20%)	2725	2823	2425	2657
Dinocap (0.048%)	3050	3063	2875	2995
Propiconazole (0.025%)	3950	4453	3600	4001
Hexaconazole (0.005%)	3850	4050	3675	3858
Difenoconazole (0.025%)	4050	4200	3025	3758
Tridemorph (0.04%)	3250	3200	3250	3233
Control	1850	1777	2175	1934
SEm±	274	211	273	147
C. D. at 5%	806	620	804	415
C. V. (%)	17.15	12.68	18.44	16.09
Y x T				
SEm±	-	-	-	252
C. D. at 5%	-	-	-	NS

Table-3 Statement showing economics of various treatments for control powdery mildew of mango

Treatment	Fruit Yield increased over control (kg)	Gross income (Rs)	Quantity of water lit/ha	Fungicide kg or lit/ha	Expenditure (Rs)		Total Expenditure (Rs)	Net return (Rs)	ICBR
					Fungicides	Labour			
Carbendazim (0.05%)	916	13740	2400	2.4	1200	900	2100	11640	1: 6.54
Wettable Sulphur (0.20%)	723	10845	2400	6.0	1050	900	1950	8895	1: 5.56
Dinocap (0.048%)	1061	15915	2400	2.4	5040	900	5940	9975	1: 2.67
Propiconazole (0.025%)	2067	31005	2400	2.4	2640	900	3540	26985	1: 8.75
Hexaconazole (0.005%)	1924	28860	2400	2.4	1080	900	1980	26880	1: 14.57
Difenoconazole (0.025%)	1824	27360	2400	2.4	7440	900	8340	19020	1: 3.28
Tridemorph (0.04%)	1299	19485	2400	1.2	1440	900	2340	17145	1: 8.32
Control	-	-	-	-	-	-	-	-	-

Price (Rs/kg) Mango unripe fruits 15/kg Carbendazim: Rs. 500/kg, Wettable sulphur: Rs. 175/kg, Dinocap :Rs. 2100/lit
 Propiconazole: Rs. 1100/lit, Hexaconazole: Rs.450/lit, Difenoconazole, Rs.3100/lit, Tridemorph: Rs.1200/lit

Penconazole10EC @1.0ml/l or hexaconazole 1.0ml/l was found effective for management of powdery mildew of urdbean[7]. Difenoconazole 25EC @2.5ml/l was found most effective fungicide for management of powdery mildew of pumpkin [8].

Conclusion

Fungicidal spray schedule was worked out based on the occurrence of key weather factors. Two sprays with wettable sulphur WP at 0.2%, dinocap EC at 0.05%, carbendazim WP at 0.1%, tridemorph EC at 0.1% or thiophanate-methyl WP at 0.1% at 15 days interval, very effectively for management of powdery mildew of mango. Cost-benefit ratio was higher in sulphur treatment followed by carbendazim [9]. Among the tested fungicides propiconazole (0.025%), hexaconazole (0.005%) and difenoconazole (0.025%) were found better ability to control powdery mildew disease as compare to wettable sulphur (0.20%), dinocap (0.048%), triadimorph(0.04%) and carbendazim (0.05%). Based on the present study propiconazole (0.025%), hexaconazole (0.005%) and difenoconazole (0.025%) were found effective control of powdery of mango.

Application of research: Looking to ICBR three sprays of hexaconazole (0.005%) at twenty days interval gave higher return and better management of powdery mildew of mango.

Research Category: Plant Pathology

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Study area / Sample Collection: Bagdu village of Junagadh district

Cultivar / Variety / Breed name: Mango

Conflict of Interest: None declared

Ethical approval: This article does not contain any studies with human participants or animals performed by any of the authors.

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