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FUNGICIDAL MANAGEMENT OF POWDERY MILDEW OF MANGO IN PUNJAB, INDIA

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ABSTRACT

Powdery mildew of mango (*Oidium mangiferae* Berthet.) is one of the major plant pathological constraints in growing successful healthy mango orchards. All the commercially cultivated varieties are susceptible to the disease. Dropping of flowers and immature fruits leads to serious crop losses to the mango growers. Keeping in view, an attempt has been made to manage the disease by exploiting the newly evolved fungicides. Triademefon 25 WP (0.05 %), benomyl 50 WP (0.1 %), hexaconazole 5 EC (0.05%), dinocap 48 EC (0.1 %), sulphur 80 WP (0.25 %) and penconazole 10 EC (0.05 %) were applied before flowering, during flowering and after fruit set from 2002 to 2004 cropping season to 16 years old mango cv. Dushehri at Punjab Agricultural University, Regional Fruit Research Station, Abohar located in the State of Punjab, India at 74.12 ^{O}E, 30.08 ^{O}N with an altitude of 185.78 meter with annual precipitation of 75-300 mm. All the fungicides were significantly effective in controlling the disease as compared to control. Penconazole, triademefon and hexaconazole proved significantly better in controlling the disease. However, penconazole excelled in checking the disease. In general, Triazole fungicides (penconazole, hexaconazole, triademefon) had shown their superiority in reducing the powdery mildew over non-triazole fungicides (benomyl, dinocap and sulphur).

Keywords: Mango, powdery mildew, fungicides, triazole, non-triazoles

INTRODUCTION

Mango powdery mildew (*Oidium mangiferae* Berthet.) is one of the serious diseases limiting the successful cultivation of mango that occupies an area of 6040 hectares with an annual production of 60400 metric tones (Anonymous, 2003). The fungus produces the symptoms of white superficial powdery masses on inflorescence, leaves and young fruits. The disease mainly attacks inflorescence resulting in premature shedding of flowers and young fruits, thus causing heavy monetary losses to the mango growers (Prakash, 1996; Misra, 2002). Applications of dinocap and sulphur are the widely adopted practices but it becomes difficult to manage the disease particularly when the disease pressure is high at the time of flowering (Sharma, 1992; Verma and Deepraj, 1998; Prakash and Raoof, 1985). The present study was therefore, undertaken to manage the disease with newly introduced fungicides for its cost effective and better management.

MATERIALS AND METHODS

Mango cv. Dushehri grown at PAU, Regional Fruit Research Station, Abohar was sprayed with Tridemefon 25 WP (0.05 %), Benomyl 50 WP (0.1 %), Hexaconazole 5 EC (0.05 %), Dinocap 48 EC (0.1 %), Sulphur 80 WP (0.25 %) and Penconazole 10 EC (0.05 %). Three sprays; before flowering, during flowering and after fruit set were given for three consecutive fruiting seasons of 2002 to 2004 to the 16 years old field grown mango plants in a Randomized Block Design. Each treatment was replicated thrice by keeping single tree per replication. The data on the development of powdery mildew was recorded on the four marked panicles in each geographical direction of each mango tree using 0-5 grade (0 = no disease; 1 = 1-20; 2 = 21-40; 3 = 41-60; 4 = 61-80 and 5 = 81-100 % panicles covered by powdery mildew). The Percent Disease Severity (PDS) and Percent Disease Control (PDC) were computed as:

$$PDS = \frac{\text{Sum of the ratings}}{\text{No. of observations}} \times \frac{100}{\text{Maximum grade}}$$

$$PDC = \frac{\text{PDS in control} - \text{PDS in treatment}}{\text{PDS in control}} \times 100$$

RESULTS AND DISCUSSION

All the fungicides controlled the disease significantly as compared to untreated control (Table 1). Among the various fungicides applied, penconazole (3.89 %) followed by triadimefon (4.98 %) had minimum disease development and provided maximum disease control (92.59 % and 90.52 %, respectively). Hexaconazole and benomyl proved better than dinocap and sulphur in controlling the mango powdery mildew. In general, triazole fungicides (penconazole, hexaconazole and triadimefon) gave minimum disease development and higher disease control as compared to benomyl, dinocap and sulphur.

During the present studies, penconazole, hexaconazole and triadimefon have showed their superiority in controlling the disease over benomyl, dinocap and sulphur. The more disease control by triazole fungicides may be due to their better ability to prevent inoculum production on the existing infection and longer protective action on the tree canopy. These fungicides have an additional advantage to prevent fresh infection by air borne conidia. The superiority of these fungicides in controlling mango powdery mildew is in fair accordance with previous reports (Prakash and Raoof, 1985; Sharma, 1992; Verma and Deepraj, 1998; Misra, 2002) on the effectiveness of triadimifon, dinocap, sulphur and carbendazim for the control of the disease. The effectiveness of triadimefon, cyproconazole and fluzilazole has also been reported by Dalvi et al. (1998) for the better control of the disease. Though dinocap, sulphur and carbendazim have been reported to be the best for the control of mango powdery mildew but during the present studies they have not provided satisfactory disease control. It may be due to the development of resistant strain of the fungus. Among the tried fungicides, penconazole showed better ability to control the disease. It may be due to its more ability to reduce inoculum as well as fresh infection which may serve as reservoir for the secondary spread of the disease. Based on the present study, the triazoles (penconazole, hexaconazole and triadimefon) each @ 0.05% can be exploited for the better management of mango powdery mildew in order to reap maximum benefit.

REFERENCES

1. Anonymous. 2003. District-wise Area and Production of different fruits in Punjab State during 2002-2003. State Dept. Horticulture, Punjab, India.
2. Dalvi, N.B., Raut, S.P., Gaikwad, S.H. and Mandokhot, A.N. 1998. Efficacy of fungicides against powdery mildew of mango in Konkan. Proc. National Symposium on Mango Production and Export. Lucknow, India 25-27 June. p. 65.
3. Misra, A.K. 2002. Integrated diseases management in mango. Manual of Summer School on Recent advances in Production, Protection and Postharvest Management of Subtropical fruits. India. p. 1-8.
4. Prakash, O. 1996. Principal Diseases of Mango: Causes and Control. p. 191-255. In: S.J. Singh (eds.), Advances in Diseases of Fruit crops in India, Kalyani Publisher, India.
5. Parkash, O. and Raoof, M.A. 1985. Spray schedule for the control of powdery mildew disease of mango. Indian J. Pl. Pathol. 3:51-52.
6. Sharma, L.M. 1992. Chemical control of powdery mildew of mango in Himachal Pradesh. Plant Dis. Res. 7 (2):282-283.
7. Verma, K.S. and Deepraj, K. 1998. Management of powdery mildew of mango. Plant Dis. Res.13 (2):190.92.

TABLES

Table 1: Comparative efficacy of fungicides in controlling mango powdery mildew

Treatment	Conc. (%)	Disease severity (%)				Disease control (%)
		2002	2003	2004	Mean	
Bayleton (Triadimefon 25 WP)	0.05	6.65	04.42	03.87	04.98	90.52
Benlate (Benomyl 50 WP)	0.10	10.90	09.18	12.21	10.76	79.52
Contaf (Hexaconazole 5 EC)	0.05	8.51	05.38	14.83	9.57	81.79
Karathane (Dinocap 48 EC)	0.10	15.60	11.68	10.42	12.57	76.08
Sulfex (Sulphur 80 WP)	0.25	21.18	17.21	17.67	18.69	64.43
Topas (Penconazole 10 EC)	0.05	5.42	02.91	03.36	03.89	92.59
Control	----	47.68	55.99	53.99	52.55	-----
CD at 5 %	3.44					

* Pooled analysis of three year of 2002, 2003 & 2004.