

# Management of blossom blight and leaf anthracnose of mango using fungicides

■ ASHISH KUMAR\* AND SHIV CHARAN SOLANKI

Department of Plant Pathology, College of Agriculture, Jawaharlal Nehru Krishi Vishwavidyalaya, REWA (M.P.) INDIA

## ARTICLE INFO

**Received** : 14.06.2014  
**Revised** : 03.09.2014  
**Accepted** : 14.09.2014

## KEY WORDS :

*Mangifera indica*, Fungicides,  
Blossom blight, Anthracnose

## ABSTRACT

In the present investigation, efforts were made on the evaluation of different fungicides (systemic, non-systemic and combination of both) against blossom blight and leaf anthracnose of mango under natural conditions. Pooled analysis of three years data indicated that three foliar sprays with a combination of non-systemic and systemic fungicide (carbendazim + mancozeb at 0.2%) at 10 days interval starting from initiation of disease symptom was found most effective in controlling both the diseases. Using this fungicide, blossom blight and anthracnose can be inhibited upto more than 75 per cent. However, among other tested fungicides, tricyclazole (0.1%) treatment resulted in mean PDI of 9.31 per cent and 8.31 per cent for blossom blight and anthracnose, respectively and was recorded as second to carbendazim + mancozeb (0.2%) in controlling the two diseases.

**How to view point the article :** Kumar, Ashish and Solanki, Shiv Charan (2014). Management of blossom blight and leaf anthracnose of mango using fungicides. *Internat. J. Plant Protec.*, 7(2) : 453-455.

Email: [ashishashish2612@gmail.com](mailto:ashishashish2612@gmail.com)

## INTRODUCTION

Mango (*Mangifera indica* L.), known as the national fruit of India, occupies nearly half of the total area under fruits in the country. In the world scenario, India shares about 56 per cent of total mango production. Mango is a tropical fruit and being in high demand fetches a good price all over the world. Langra is one of the important commercial varieties of mango and is acclaimed to be one of the best Indian mango varieties, in domestic as well as in overseas markets owing to its characteristic turpentine flavour. However, the crop is challenged by several foliar diseases which cause large scale yield loss of mango crop affecting the economy of farmers across the country. Lately, blossom blight caused by *Alternaria alternata* has been posing a most serious problem in most mango growing countries (Kwee and Chang, 1985) and causes 100 per cent loss if not controlled. The disease has been in existence for long but the severity has been recognized only

during early nineties. The co-occurrence of rains or heavy fog with flowering tends to increase the disease incidence manifold. The early symptoms of blossom blight are inflorescence wilting and production of minute black spots, which later enlarge and coalesce, resulting in shedding of flowers and shrivelling and drying of flower axes. The affected inflorescence turns dark brown to greenish black, and fails to set the fruits. However, the severity of the disease is greatly dependent on environmental factors contributing to induced stress on trees during inflorescence development (Lonsdale, 1993). Foliar anthracnose of mango caused by *Colletotrichum gloeosporioides* Penz and Sacc., is another most damaging pre harvest diseases in all mango producing areas. It causes damage to foliage and under crowded and moist conditions causes serious problem in nurseries and young orchards (Udhaya Kumar and Rani, 2010). It can also cause flower set reduction resulting in yield losses in mango. In recent years, mango growers have faced problems in controlling this disease

with fungicides as pathogen develops resistance. Keeping the above points in view, the present investigation was undertaken to evaluate the efficacy of some systemic, non-systemic and combinations of both types of fungicides against blossom blight and foliar anthracnose of mango.

## MATERIAL AND METHODS

All field experiments were conducted under *in vivo* conditions at Fruit Research Station, Rewa. Experiment for blossom blight was conducted for three consecutive years during 2010-11, 2011-12 and 2012-13 and experiment for anthracnose was conducted during 2008-09, 2009-10 and 2010-11. Mango of local variety Langra was used throughout the experiment.

Efficacy of three non-systemic fungicides (Chlorothalonil @0.2%, mancozeb @0.2% and propineb @ 0.2%), three systemic (carbendazim @0.1%, thiophanate methyl @0.1% and tricyclazole @0.1%) and one combination of both (carbendazim + mancozeb @0.2%) were evaluated using 32 uniform flowering trees in a R.B.D. with three replications. The fungicides were sprayed thrice at 10 days interval starting from initiation of disease symptom in mango leaves and inflorescence. Disease incidence was recorded on randomly selected 100 leaves/treatment (for anthracnose) and 100 inflorescence/treatment (for blossom blight) before the beginning of first spray of fungicides and subsequent observations were recorded after 10 days of each spray. Disease severity was assessed using 0-5 scale where 0= No leaf spot infection and 5= more than 75 per cent portion of leaf infected. Per cent Disease Index (PDI) was calculated. Further, per cent inhibition in disease was calculated over control using the following formula :

$$PDI = \frac{(C - T)}{C} \times 100$$

where,

C = PDI in control and

T = PDI in treatment (Vincent, 1947).

All the data were statistically analyzed at ARIS Cell, College of Agriculture, Rewa. The treatment means were compared with level of significance  $p = 0.05$  (Gomez and Gomez, 1984).

## RESULTS AND DISCUSSION

A set of seven fungicides was evaluated at their respective concentration against blossom blight of mango and it was observed that all the seven fungicides significantly reduced the occurrence of blossom blight. Among different tested fungicides, carbendazim + mancozeb (0.2%) was found significantly superior over other tested fungicides and mean PDI of 7.51 per cent was recorded based on pooled data of three consecutive years (Table 1). This was followed by tricyclazole (0.1%) where mean PDI of 9.31 per cent was recorded. Per cent inhibition in blossom blight among different chemicals ranged from 45.11 to 79.03 per cent. Results clearly indicated that, combination of systemic and non-systemic fungicide (carbendazim + mancozeb), maximum inhibited (79.03%) the blossom blight followed by tricyclazole (0.1%) where 74.01 per cent inhibition was calculated.

The pooled data (Table 2) for three mango cropping seasons revealed that all seven fungicides at their respective concentration, when sprayed thrice at 10 days interval, efficiently reduced the natural incidence of leaf anthracnose as compared with control. Mean PDI ranged from 6.46 to 14.86 per cent among different treatments excluding control. In control plants where only water was sprayed mean PDI of 27.02 per cent was recorded. Among different treatments, foliar spray with carbendazim + mancozeb (0.2%) was found most effective in controlling the foliar anthracnose during all the three years and mean PDI of 6.46 per cent was recorded based on pooled data of three mango cropping seasons (Table 2). This was followed by foliar spray of tricyclazole (0.1%) where mean PDI of 8.31 per cent was recorded. Per cent inhibition in foliar anthracnose was calculated over control and it was observed that out of seven tested fungicides, a set

Treatments (%)	Per cent disease index (PDI)			Mean PDI	Per cent inhibition
	Year I	Year II	Year III		
Carbendazim (0.1)	9.60 (18.05)*	10.33 (18.72)	10.67 (19.09)	10.20 (18.63)	71.52
Thiophanate methyl (0.1)	16.13 (23.66)	15.67 (23.34)	14.67 (22.54)	15.49 (23.18)	56.76
Mancozeb (0.2)	10.30 (18.72)	10.67 (19.09)	12.33 (20.53)	11.10 (19.46)	69.01
Chlorothalonil (0.2)	18.97 (25.84)	20.00 (26.57)	20.00 (26.57)	19.66 (26.3)	45.11
Tricyclazole (0.1)	8.27 (16.74)	9.33 (17.76)	10.33 (18.72)	9.31 (17.76)	74.01
Carbendazim (12%) + Mancozeb (63%) (0.2)	7.20 (15.56)	7.33 (15.68)	8.00 (16.43)	7.51 (15.89)	79.03
Propineb (0.2)	11.50 (19.82)	12.33 (20.53)	13.33 (21.39)	12.39 (20.62)	65.41
Control	34.80 (36.15)	36.00 (36.87)	36.67 (37.29)	35.82 (36.75)	0.00
C.D. (P=0.05)	5.3	7.75	2.11		

Figures in parenthesis are angular transformed values

**Table 2 : Efficacy of fungicides against foliar anthracnose disease of mango**

Treatments (%)	Per cent disease index (PDI)			Mean PDI	Per cent inhibition
	Year I	Year II	Year III		
Carbendazim (0.1)	10.43 (18.81)*	9.50 (17.95)	8.10 (16.54)	9.34 (17.76)	65.43
Thiophanate methyl (0.1)	13.36 (21.47)	12.54 (20.70)	12.47 (20.70)	12.79 (20.96)	52.66
Mancozeb (0.2)	9.68 (18.15)	13.51 (21.56)	13.97 (21.97)	12.39 (20.62)	54.15
Chlorothalonil (0.2)	12.53 (20.70)	11.59 (19.91)	10.53 (18.91)	11.55 (19.91)	57.25
Tricyclazole (0.1)	9.80 (18.24)	7.80 (16.22)	7.33 (15.68)	8.31 (16.74)	69.25
Carbendazim (12%) + Mancozeb (63%) (0.2)	8.60 (17.05)	5.50 (13.56)	5.27 (13.31)	6.46 (14.77)	76.09
Propineb (0.2)	13.66 (21.72)	15.55 (23.26)	15.37 (23.11)	14.86 (22.71)	45.00
Control	29.70 (33.02)	25.50 (30.33)	25.87 (30.59)	27.02 (31.31)	0.00
C.D. (P=0.05)	4.1	4.5	5.1		

\*Figures in parenthesis are angular transformed values

of three fungicides viz., carbendazim (0.1%), tricyclazole (0.1%) and carbendazim + mancozeb (0.2%) inhibited more than 60 per cent of foliar anthracnose. However, minimum inhibition of 45.0 per cent in foliar anthracnose was recorded by treatment with propineb (0.2%). Use of organic sulphur, dithiocarbamates fungicides like zineb, maneb and heterocyclic nitrogen compounds-captan also proved adequate control against mango anthracnose. However, these fungicides showed phytotoxic effect to flowers. Mancozeb, an organic sulphur group fungicide was reported very effective when applied with copper fungicide, for post harvest disease of mango (Karnade *et al.*, 2007). Sharma and Verma (2007) have also reported systemic fungicides being most effective for anthracnose management. Singh (2013) recorded the minimum incidence of post harvest fruit rot when treated with hot water treatment supplemented with thiophanate methyl (0.1%) or carbendazim (0.1%). Gajbhiye *et al.* (2000) reported that carbendazim @ 0.05 per cent in mango fruits reduced the post harvest rot as well as showed no residues. Venkataravanappa and Nargund (2008) have also reported that carbendazim (0.1%) was most effective in managing mango anthracnose.

### Conclusion :

Based on the findings of the present study, it was concluded that three sprays of carbendazim + mancozeb at 0.2 per cent (combination of both non-systemic and systemic fungicide) proved most efficient in reducing the severity of blossom blight and anthracnose disease of mango under field conditions.

### Acknowledgement :

Author owes his gratitude to Dr. J. Singh, Dr. T.K. Singh and Dr. S. K. Tripathi for providing annual report of AICRP

on mango for the year 2010-11.

## REFERENCES

- Gajbhiye, V.T., Singh, R., Kumar, R.H. and Singh, C.P. (2000).** Efficacy of post harvest treatment of carbendazim against stem end rot/ anthracnose disease of mango. *Ann. Pl. Protec. Sci.*, **8**: 230-232.
- Gomez, K.A. and Gomez, A.A. (1984).** *Statistical procedures for agricultural research*. John Wiley Sons, SINGAPORE .
- Karande, M.G., Raut, S.P. and Gawande, A.D. (2007).** Efficacy of fungicides, bio-organics and plant extracts against *Colletotrichum gloeosporioides* and *Fusarium oxysporum*. *Ann. Pl. Protec. Sci.*, **15**: 267-268.
- Kwee, L.T. and Chang, K.K. (1985).** *Diseases and disorders of mango in Malaysia*. pp. 1-23. Tropical Press. MALAYSIA.
- Lonsdale, J.H. (1993).** Mango diseases in South Africa. *South African Mango Growers' Association Yearbook*, **13** : 89-92.
- Sharma, Abhishek and Verma, K.S. (2007).** *In vitro* cross pathogenicity and management of *Colletotrichum gloeosporioides* causing anthracnose of mango. *Ann. Pl. Protec. Sci.*, **15**:186-188.
- Singh, A.K. (2013).** Management of post harvest anthracnose disease of mango by pre and post harvest treatments. *Ann. Pl. Protec. Sci.*, **21**: 446-447.
- Udhaya Kumar, R., and Usha Rani, S. (2010).** Epidemiological and nutritional factors on growth of *Colletotrichum gloeosporioides*. *Ann. Pl. Protec. Sci.*, **18** : 159-163.
- Venkataravanappa, V., and Nargund, V.B. (2008).** Sensitivity of mango anthracnose to fungicide. *Ann. Pl. Protec. Sci.*, **16**: 244-246.
- Vincent, J.M. (1947).** Distortion of fungal hyphae in the presence of certain inhibitors. *Nature*, **150** : 850.

7<sup>th</sup>  
Year  
★★★★★ of Excellence ★★★★★