

*Short Communication*

## Management of Premature Leaf Fall in Apple by using Different Combination of Fungicides

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### INTRODUCTION

Apple is one of the most important temperate fruit crops in terms of land use efficiency with better opportunities for higher returns, friendly environment and employment generation. In India, it is commercially grown in the states of Jammu & Kashmir, Himachal Pradesh, Kumaun and Garhwal hills of Uttarakhand and parts of Sikkim and Arunachal Pradesh. In Himachal Pradesh, apple cultivation has revolutionized the socio-economic conditions of farmers and it is a leading commercial fruit crop being cultivated over 1.10 lakh ha with annual production of 7.7 lakh mt (Anony, 2016). However, during past two decades, Marssonina blotch/ premature leaf fall caused by Marssonina coronaria has become a major bottleneck in successful apple cultivation in Shimla, Mandi, Kullu and Kinnaur districts of Himachal Pradesh. Premature leaf shedding in apple has also been reported from Jammu & Kashmir, Uttarakhand and Bhutan (Sharma and Verma, 1999). The disease starts appearing in the months of May-June, and by the mid of August, most of ill managed orchards are severely affected with typically leaf spotting, yellowing and falling of leaves, ultimately, fruits near maturity are generally seen hanging from defoliated branches of affected trees (Sharma and Gautam, 1997).

In Himachal Pradesh, every year an integrated spray schedule is released for the management

of fungal diseases in apple by the Department of Horticulture, in collaboration with Dr YS Parmar University of Horticulture and Forestry, Nauni, Solan, HP recommending different fungicidal sprays at different stages. To validate various recommended fungicide combinations for the effective management of premature leaf fall, multilocational trials were conducted, besides organization of field days and training programmes on these sites to disseminate proper canopy and orchard floor management practices for reduction of primary inoculum.

### MATERIALS AND METHODS

A survey was conducted in different blocks of the district Shimla, Himachal Pradesh, to know the reasons for high incidence of premature leaf fall and to select orchards to conduct location specific trials and demonstrations. Locations having the micro climate of high humidity and temperature that are pre-disposing factors for disease development were found to have high disease incidence. Other factors, which favored the spread of the disease in the orchard were:

Dense canopy favouring high humidity and poor aeration during fruiting period in the orchard and is major disposing factor for high disease severity.

The farmers were spraying fungicides up to drip-off situation and, not using prophylactic sprays for the management of the disease.

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Moreover, farmers used mixtures of fungicides, insecticides and nutrients on routine basis, which contribute in aggravating the severity of disease.

All important factors of the premature leaf fall/ Marssonina leaf blotch development in apple were taken into consideration to manage the disease in different orchards representing the specific microclimatic conditions. High humidity and poor aeration were the important pre-disposing factors in disease development, aggravated by dense canopy and poor orchard floor management practices. Therefore, to create awareness among farmers about the proper management practices i.e. canopy and orchard floor management, training programs were organized with scientist of fruit science in the surveyed areas of the district. Demonstrations on canopy management were given to farmers to enhance penetration of sunlight and aeration in tree canopy. Floor management by manual weeding in the basin areas of the tree from time to time (May to August) was also demonstrated, which helped in reducing the humidity in the canopy of the tree and improving aeration in the orchard.

Keeping in view the losses resulted due to the disease, on farm trials (OFTs) at five locations (two in Rohru, one each at Chirgaon, Jubbal and Kotkhai) in district Shimla, Himachal Pradesh were conducted

for the management of the disease by using three different combinations of fungicides selected from spray schedule of Department of Horticulture, Himachal Pradesh and Dr YS Parmar University of Horticulture and Forestry, Solan released with few modifications. The sprays were given as per schedule given in Table 1 and farmers' practice i.e. sprays of fungicides (carbendazim, mancozeb, propineb, dodine etc.) without consideration of proper fruit development stage, was kept as control.

## RESULTS AND DISCUSSION

The incidence of Marssonina blotch ranged between 50 to 95 per cent was recorded in different orchards. In management of Marssonina blotch, sprays of suitable fungicide combinations at proper fruit development stage with canopy and floor management gave excellent results in comparison to farmers' practice. A spray schedule with fungicide combination of mancozeb 75 WP (500g) + carbendazim 50 WP (100g) at walnut stage, followed by propineb 70 WP (600g) at fruit development stage (20 days after previous spray, dodine 65 WP (150g) at fruit development stage (20 days after previous spray) and carbendazim 50WP (100g) at preharvest stage (20-25 days before harvest) all per 200l of water, was found best

**Table1. Different fungicides spray schedule evaluated for management of Marssonina blotch / premature leaf fall in apple**

Stage	Fungicide spray schedule		
	I	II	III
Walnut size	Mancozeb 75 WP (600gm)*	Zineb 75 WP(600 gm)	Mancozeb 75 WP (500gm) + carbendazim 50 WP(100 gm)
Fruit Development (20 days after above)	Carbendazim 50 WP(100 gm)	Thiophenate Methyl 70 WP (100gm)	Propineb 70 WP (600gm)
Fruit development (20 days after above)	Propineb 70 WP (600gm)	Mancozeb 75WP (600 gm)	Dodine 65 WP (150gm)
Preharvest (20-25 days before harvest)	Ziram 27 SL (600ml)	Carbendazim 50 WP (100 gm)	Carbendazim 70 WP (100 gm)

\*quantity used per 200 liters of water

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**Table 2. Efficacy of different fungicide combinations in controlling *Marssonina coronaria* causing premature leaf fall in apple.**

Treatment	Percent Disease Incidence*			
	First year		Second year	
Schedule I	13.33	(21.34)	10.33	(19.79)
Schedule II	8.33	(16.71)	7.00	(15.83)
Schedule III	5.73	(13.77)	5.00	(13.13)
Control (Farmers' practice)	79.77	(63.76)	60.77	(51.30)
C.D.		4.840		4.860

\*Pooled data for ten locations

Figures in parentheses are Arc sine transformed values

with minimum disease incidence and at par with schedule followed by spray schedule I (Table 2). The percent disease incidence in control treatment (farmers' practice) was very high.

Earlier studies indicated that protective sprays of mancozeb, carbendazim, dodine etc were effective for the management of premature leaf fall (Sharma and Gautam, 1997; Sharma *et al* 2004; Thakur and Sharma, 2010). Similarly, integrated sprays of fungicides at different fruit development stages have been found effective by Sharma and Bhardwaj (2003) in management of premature leaf fall.

### REFERENCES

Anonymous. (2016). <http://hhorticulture.nic.in>

Sharma I M and Bhardwaj S S ( 2003). Efficacy and economics of different fungicide spray schedule in controlling premature leaf fall of apple. *Plant Disease Res* **18**: 21-24.

Sharma J N and Gautam D R ( 1997). Studies on premature leaf fall of apple –a new problem. *Plant Protection* **25**: 8-12.

Sharma J N, Sharma Anita and Sharma Pankaj (2004). Outbreak of *Marssonina* blotch in warmer climates causing premature leaf fall problem of apple and its management. *Acta Horticulturae* **662**: 405-409.

Sharma J N and Verma L R (1999). *Premature leaf fall problem in apple: diagnosis and control*. In: Diseases of Horticultural Crops- Fruits, (Eds. Verma L R and Sharma R C). Indus Publishing Co., New Delhi, pp.81-88.

Thakur V S and Sharma Nirupma (2010). Epidemic outbreak of apple blotch disease: epidemiology and management in Himachal Pradesh. *Indian Phytopath* **63**(2):141-144.

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