

# Management of Freckle Leaf Spot Disease of Banana

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## SUMMARY

An experiment was conducted during 2002-2004 at farmers field, Chikkodi Taluka, Belgaum district. The experimental results revealed that, the treatment mancozeb 0.25% + copper oxychloride 0.3% effectively controlled the freckle leaf spot disease of banana caused by *Phyllosticta musarum* followed by alternated spray of carbendazim 0.1% f.b. mancozeb 0.25%. The treatment mancozeb 0.25% + copper oxychloride 0.3% recorded the highest yield of 37.68 t/ha followed by carbendazim 0.1% (33.0 t/ha) and the lowest yield was recorded in control (24.57 t/ha). The cost benefit ratio was highest (1: 4.49) in the treatment of mancozeb 0.25% + copper oxychloride 0.3% followed by carbendazim (1: 3.91) and mancozeb 0.25% (1: 3.60).

## Key words :

Freckle leaf spot,  
Banana,  
*Phyllosticta musarum*.

Banana, an important tropical fruit crop is affected by several diseases caused by fungi, bacteria, viruses, nematodes and abiotic factors. Among these, Panama disease caused by *Fusarium oxysporum* f.sp. cubense and Sigatoka leaf spot caused by *Mycosphaerella musicola* are regarded to be the most destructive one. Freckle disease of banana caused by *Phyllosticta musarum* (Cooke) Petrak is wide spread wherever banana is grown. Only if fruit infection occurs, the fungus is considered as serious. In this case, leaves with freckle may be the source of inoculum. Symptoms on leaves first appear as small, dark brown or black spots usually circular or superficial. They may spread to stalk along the leaf vein, formation of circular area with dark brown or grayish centre surrounded by yellowish green halo. In some cases, spots coalesce to form dense aggregation, rough to touch and cause larger area to death lesions.

Elangovan *et al.* (1990) reported the occurrence of this disease in Tamil Nadu. The prevalence of freckle leaf spot has been recorded at Coimbatore, Trichy, Periyar and North Arcot districts of Tamil Nadu during 1995-96 (Anonymous, 1997). Chuang (1981) reported the freckle leaf spot in Taiwan and observed 21 to 62 per cent of diseased tissues. Survey conducted during 1997-98 revealed that the freckle leaf spot disease was noticed at Raibagh, Jamakhandi and Gokak taluk of

Northern Karnataka (Anonymous, 2000). Hence, the present investigation was undertaken to find out the effective fungicide(s) for the management of freckle leaf spot disease of banana.

## MATERIALS AND METHODS

An experiment was conducted during 2002-2003 and 2003-2004 at Chikkodi Taluka, Belgaum district. The experiment was laid out in a Randomized Block Design with a spacing of 2.0 and 2.0m There were seven treatments viz., carbendazim 0.1%, mancozeb 0.25%, copper oxychloride 0.3%, mancozeb + copper oxychloride 0.25% + 0.3%, neem oil 0.5%, alternate sprays of carbendazim 0.1% followed by mancozeb 0.25% and control. Spraying was started when the disease was observed on few plants. A scale of 0-5 was used for recording the disease intensity (Kotasthane and Agarwal, 1976). Observations were recorded with respect to PDI and yield.

## RESULTS AND DISCUSSION

Data recorded in Table 1 indicate that during 2002-2003, three sprays of mancozeb 0.25%+copper oxychloride 0.3% at 15 days interval effectively controlled the freckle leaf spot disease (16.91%) followed by alternate sprays of carbendazim 0.1% f.b mancozeb 0.25% (21.61%), carbendazim 0.1% (23.65%). The highest PDI was recorded in control

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(41.05%).

During 2003-2004, two sprays of mancozeb 0.25% + copper oxychloride 0.3% at 21 days interval effectively controlled the freckle leaf spot disease (10.18%) followed by alternate sprays of carbendazim 0.1% f.b mancozeb 0.25% (10.68%), mancozeb 0.25% (13.57%) and carbendazim 0.1% (14.38%).

Average of two years data revealed that, the treatment mancozeb 0.25% + copper oxychloride 0.3% effectively controlled the freckle leaf spot disease (13.54%) followed by alternate sprays of carbendazim 0.1% f.b mancozeb 0.25% (16.15%) (Table 1).

Treatments	Conc. (%)	PDI		
		2002-03	2003-04	Mean
T <sub>1</sub> Carbendazim	0.1	23.65 (29.00)	14.38 (22.26)	19.01 (25.64)
T <sub>2</sub> Mancozeb	0.25	26.23 (30.68)	13.57 (21.49)	19.90 (26.09)
T <sub>3</sub> Copper oxychloride	0.3	27.71 (31.47)	16.29 (23.79)	22.0 (27.63)
T <sub>4</sub> Mancozeb + Copper oxychloride	0.25 + 0.3	16.91 (24.18)	10.18 (18.57)	13.54 (21.38)
T <sub>5</sub> Neem oil	0.5	24.49 (29.58)	17.86 (24.91)	21.18 (27.24)
T <sub>6</sub> Alternate spray of Carbendazim f.b. Mancozeb	0.1 0.25	21.61 (27.34)	10.68 (18.88)	16.15 (23.11)
T <sub>7</sub> Control	–	41.05 (39.82)	31.41 (34.04)	36.23 (36.93)
S.E. ±		2.16	1.45	1.07
C.D. (P=0.05)		6.66	4.48	3.30

Figures in the parenthesis are the angular transformed values

### Yield:

During 2002-2003, with regards to yield, the highest yield was recorded in the treatment of mancozeb 0.25% + copper oxychloride 0.3% (41.74 t/ha) followed by carbendazim 0.1% (34.61 t/ha) and alternate sprays of carbendazim 0.1% f.b mancozeb 0.25% (31.29 t/ha). The lowest yield was recorded in control (25.45t/ha) (Table 2).

During 2003-2004, the treatment mancozeb 0.25% + copper oxychloride 0.3% recorded the highest yield of 10.89 kg/ plant followed by carbendazim 0.1% (10.18 kg /plant) and it was lowest in control (8.0 kg /plant). The highest yield was obtained in the treatment of mancozeb 0.25% + copper oxychloride 0.3% (33.61 t/ha) followed by carbendazim 0.1% (31.40 t/ha) and alternate sprays of carbendazim 0.1% f.b mancozeb 0.25% (30.69 t/ha). The lowest yield was recorded in control (23.69 t/ha).

Average of two years data revealed that, the treatment mancozeb 0.25% + copper oxychloride 0.3% recorded the highest yield of 37.68 t/ha followed by carbendazim 0.1% (33.0 t/ha) (Table 2).

With regard to cost benefit ratio, higher cost benefit ratio was higher in the treatment of mancozeb 0.25% + copper oxychloride 0.3% (1:4.49) followed by carbendazim (1:3.91) and mancozeb 0.25% (1:3.60) (Table 3).

In single leaf tissues, symptoms of the disease were inhibited when maneb, mancozeb, plantineb, Daconil (chlorothalonil) and benlate (benomyl) were sprayed on the adaxial surface of the first open leaf, but there was no inhibitory effect on the abaxial surface. Macozeb was more effective than benomyl however, mineral oil was ineffective. In the field maneb and mancozeb in oil water emulsion in the oil only and Bravo 6 F (chlorothalonil) and Daconil in water only gave good control. (Chuang,

**Table 2 : Chemical control of freckle leaf spot disease of banana**

Treatments	Conc. %	Yield (kg/plant)			Yield (t/ha)		
		2002-03	2003-04	Mean	2002-03	2003-04	Mean
T <sub>1</sub> Carbendazim	0.1	11.22	10.18	10.70	34.61	31.40	33.00
T <sub>2</sub> Mancozeb	0.25	9.96	9.89	9.96	30.74	30.52	30.63
T <sub>3</sub> Copper oxychloride	0.3	9.11	8.84	8.98	28.13	27.29	27.71
T <sub>4</sub> Mancozeb + Copper oxychloride	0.25 + 0.3	13.52	10.89	12.21	41.74	33.61	37.68
T <sub>5</sub> Neem oil	0.5	9.84	8.82	9.33	30.35	27.23	28.79
T <sub>6</sub> Alternate spray of Carbendazim f.b. Mancozeb	0.1 0.25	10.14	9.94	10.04	31.29	30.69	30.99
T <sub>7</sub> Control	–	8.73	8.0	8.37	25.45	23.69	24.57
S.E. ±		0.58	0.28	0.34	1.70	0.89	1.10
C.D. (P=0.05)		1.78	0.89	1.05	5.24	2.75	3.40

**Table 3 : Chemical control of freckle leaf spot disease of banana**

Treatments	Conc. %	Cost Benefit Ratio		
		2002-03	2003-04	Mean
T <sub>1</sub> Carbendazim	0.1	1 : 3.83	1 : 3.98	1 : 3.91
T <sub>2</sub> Mancozeb	0.25	1 : 3.28	1 : 3.92	1 : 3.60
T <sub>3</sub> Copper oxychloride	0.3	1 : 2.92	1 : 3.39	1 : 3.20
T <sub>4</sub> Mancozeb + Copper oxychloride	0.25 + 0.3	1 : 4.63	1 : 4.35	1 : 4.49
T <sub>5</sub> Neem oil	0.5	1 : 3.31	1 : 3.35	1 : 3.33
T <sub>6</sub> Alternate spray of Carbendazim f.b. Mancozeb	0.1 0.25	1 : 3.24	1 : 3.76	1 : 3.50
T <sub>7</sub> Control	—	—	—	—

1983). Tsai *et al.* (1989) reported that, the most effective fungicide was 25 per cent propiconazole (Tilt) at 0.4 kg per hectare. In Hawaii, spraying to the leaves and fruit reduced the diseases (Pitak, 1986).

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