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## Management of yellow sigatoka disease of banana through fungicides under field condition

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D. K. MISRA, F. K. BARUI, B. BANDYOPADHYAY AND S. K. SARKAR

All India Coordinated Research Project on Tropical Fruits, Bidhan Chandra Krishi Viswavidyalaya, Kalyani 741235, West Bengal

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Banana being widely grown in tropical countries and India is the largest producer in the world. Yellow sigatoka of banana caused by *Cercospora musae* (*Mycosphaerella musicola*) is the most important disease causing severe yield loss in almost all the growing areas. Seven fungicides viz. carbendazim, propiconazole, copper oxychloride, tridemorph, mancozeb, hexaconazole and chlorothalonil were tested to find out their efficacy in controlling the disease under field condition. All the chemicals were effective in reducing the leaf spot severity significantly as compared to control. Propiconazole (0.025%) reduced the disease severity (35.85) and increased yield (359 q/ha) which was 98.34% over the yield of control, was observed the most effective fungicide. Mancozeb was least effective among the fungicides tested. Propiconazole also resulted highest cost-benefit ratio (8.4) followed by tridemorph (6.9) and carbendazim (6.3).

**Key words :** Banana, yellow sigatoka, fungicides, management, cost-benefit ratio

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### INTRODUCTION

Among the different diseases of banana the leaf spot or yellow sigatoka is probably the most serious one. The disease is prevalent in almost all the banana growing countries of the world though it was first identified in 1963 from sigatoka district of Fiji. In India the disease is a problem in all the banana growing states and in West Bengal it is a serious menace in view of extending area under commercial cultivation. Rawal (2000) pointed out two most important diseases in India are Panama wilt and yellow sigatoka of banana. Cavendish group cultivars are more susceptible to the disease.

Incidence of the disease is being recorded throughout the year but severity increases in monsoon months i.e. moderate high temperature with high relative humidity or intermittent rainfall is conducive for development and spread of sigatoka leaf spot. Loss of yield may reach upto 50% in some ill managed orchards. Elangivan *et al.*, (1990) reported from Tamil Nadu that average incidence of

leaf spot was 26.6 per cent in the state. Considering the above facts a field trial was conducted during 2000-2002 to evaluate the efficacy of effective fungicides and their cost viability for management of the disease.

### MATERIALS AND METHODS

The field experiment was conducted in the Viswavidyalaya farm with commercial cultivar "Martaman". Disease free suckers were collected from well managed orchard. Planting materials were treated with 0.1% organomercurials and 0.1% carbendazim before planting. Seven fungicides belonging to different chemical groups were tested in this study. For better spray efficiency Triton X-100 as surfactant was incorporated with fungicidal solution @ 0.5 ml/litre. The different chemicals used are tridemorph, carbendazim, propiconazole, mancozeb, hexaconazole, chlorothalonil and copper oxychloride. One control treatment (water spray) was also maintained for comparison among the treatments.

The trial was conducted in randomised block design with three replications and 15 plants/treatment. In both the years (2000-01 and 2001-02) planting were done during first week of July. Treatments were imposed from second week of June when infection level reaches 2% leaf area in each of about 10% plants. Second, third and fourth sprays were followed at 21 days interval.

Disease score at 20 days and 110 days after final spray as per cent disease index (PDI) was recorded when plants are in shooting (50%) and maturity (50%) stage respectively. Physical parameters at shooting stage and fruit yield at harvest were recorded. Cost-benefit ratio of the treatments are also calculated. Data obtained were statistically analysed.

## RESULTS AND DISCUSSION

The mean data of different parameters were presented in Table 1. The data revealed that all the treatments were significantly superior with regard to disease reduction over control. Efficacy of the chemicals showed great variations. At 50% shooting maximum PDI (57.80) was recorded in control while minimum PDI (20.36) was recorded with propiconazole. However at 50% maturity lowest PDI was recorded in case of propiconazole (35.85), while the same with carbendazim and tridemorph were 44.60 and 47.61 respectively. Mancozeb showed least effective (65.25) and maximum

disease intensity was recorded in the control plot (82.24).

Percentage of healthy and infected leaves were recorded to be maximum in case of propiconazole (91.6) and copper oxychloride (66.8). Maximum height (272 cm) in carbendazim and maximum girth (72.05 cm) in tridemorph were recorded. However, no significant difference in plant height and basal girth was observed. Maximum fruit yield was obtained with propiconazole (359 kg/ha) followed by tridemorph (325 kg/ha) while minimum fruit yield was recorded in case of control (188 kg/ha). Highest cost-benefit ratio (8.4) was recorded with propiconazole. With regards to tridemorph and carbendazim the cost-benefit ratios are 6.9 and 6.3 respectively.

The study revealed that among the fungicides tested, efficacy of propiconazole was recorded to be the best in terms of PDI as well as fruit yield while mancozeb was observed to be the least effective chemical. Spraying of propiconazole also produced 42.46% higher fruit yield over mancozeb and 98.34% over the control. Efficacy of propiconazole against black sigatoka was also supported by the findings of Guzman and Romero (1997). Carbendazim and tridemorph followed the performance of propiconazole in reducing the leaf spot disease. Application of carbendazim along with mancozeb is very effective fungicide for reducing infection of *M. musicola* in banana (Turner *et al.*,

Table 1 : Management trial on sigatoka leaf spot with chemical fungicides

Treatments/ Fungicides	Dosage (%)	Healthy leaves (%)	Infected leaves (%)	Height of plant (cm)	Basal girth (cm)	PDI at 50% Shooting	Maturity time (days)	PDI at 50% maturity	Bunch yield (Q/ha)	Yield increase over Control(%)	Cost benefit ratios of fungicides
T <sub>1</sub> -Carbendazim	0.015	85.40	14.60	272.00	71.68	23.75	438.00	44.60	313.00	72.93	6.30
T <sub>2</sub> -Mancozeb	0.10	67.60	32.40	268.00	69.71	38.15	445.00	65.25	252.00	39.23	3.20
T <sub>3</sub> -Tridemorph	0.05	86.30	13.70	265.00	72.05	26.45	441.00	47.61	326.00	80.11	6.90
T <sub>4</sub> -Hexaconazole	0.005	75.00	25.00	270.00	68.56	29.32	443.00	56.32	273.00	50.83	4.80
T <sub>5</sub> -Propiconazole	0.025	91.60	8.04	268.00	71.24	20.36	439.00	35.85	359.00	98.34	8.40
T <sub>6</sub> -Copper oxy- chloride	0.15	66.80	33.20	269.00	68.51	33.62	451.00	60.30	239.00	32.04	2.90
T <sub>7</sub> -Chlorathalonil	0.15	79.50	20.50	264.00	70.85	24.37	438.00	53.74	283.00	56.35	3.90
T <sub>8</sub> -Control (Water spray)	-	41.40	59.60	266.00	66.75	57.80	450.00	82.24	188.00	--	--
S. Em ±	--	5.04	1.77	5.84	2.51	1.81	4.67	4.13	7.51	--	--
C. D. at 5%	--	10.81	3.80	12.53	5.38	3.88	10.15	8.56	16.11		

Date are the average of two years (2000-01 and 2002-02)

1981). Research report of Hoq *et al.*, (1994) also corroborated with the present findings where best control of yellow sigatoka and higher bunch yield was recorded through propiconazole sprays. Application of fungicide seems to be beneficial as all the tested chemicals showed positive response against the disease. Higher value of cost-benefit ratio was manifested by managing the disease through propiconazole. Under the circumstances from the present study it can be concluded that propiconazole is the most effective and economic fungicide for management of yellow sigatoka of banana.

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INTRODUCTION

Importance of leaf application of fungicides has been reported by workers (Sinha & Saha 1981; Saha & Sinha 1982). Fungicides have been used in banana plantations and other crops to control diseases and other pests. Fungicides are commonly used as protectants or curatives to control diseases of banana. Fungicides are also used to control diseases of banana. Fungicides are also used to control diseases of banana.