



RESEARCH NOTE

Management of Sigatoka leaf spot disease of banana caused by *Mycosphaerella musicola*

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ABSTRACT: A field experiment was conducted during 2012-2014 to find out the effect of five fungicides viz., propiconazole 0.1 %, mancozeb 75 WP @0.2%, difenconazole 25% EC @ 0.1%, mancozeb + carbendazim (0.1%) and Tebuconazole 50% + Trifloxystrobin 25% WG @0.5 g/L alone and in combination with mineral oil 1% for the management of Sigatoka leaf spot disease of banana caused by *Mycosphaerella musicola*. Among all the eleven treatments tested, four sprays of combination of mineral oil 1% + tebuconazole 50% + trifloxystrobin 25% WG @ 0.5 g/l with the onset of the disease at 30 days interval was proved to be effective and resulted the lowest per cent disease index (16.12%) compared to control (30.18%). This treatment also gave a fairly good benefit: cost (B: C) ratio of 1:1.62 with highest yield (53.30t/ha).

Keywords: Banana, Sigatoka leaf spot, *Mycosphaerella musicola*, management

Banana (*Musa paradisiaca* L.) is one of the most important fruit crops grown in India with an area of 803 thousand hectares with productivity of 37.0 million tonnes (NHB Data base, 2014). Among various diseases of banana, leaf spot or yellow sigatoka caused by *Mycosphaerella musicola* is a very serious disease in tropical banana growing areas (Stover, 1980). The sigatoka leaf spot is the major foliar disease affecting the productivity of the tissue culture banana variety Grand Naine, which is the most popularly grown variety in Andhra Pradesh. This variety is highly susceptible to yellow sigatoka leaf spot. Hence, there is a need to evaluate the efficacy of some available fungicides in combination with petroleum based mineral oil for the effective management of this disease.

A field trial was conducted during 2012-14 at Horticultural Research Station, Mahanandi of Kurnool district, Andhra Pradesh, India for the management of yellow Sigatoka leaf spot disease of banana caused by *M. musicola*. A popular and most susceptible variety Grand Naine was selected for conducting the experiment. The experiment was laid out in randomized block design (RBD) with three replications. The crop was raised by following standard agronomic practices. The plant to plant

and row to row spacing was 1.8 x 1.8 m. with a plot size of 2x2 m. There were eleven treatments consisting five fungicides and mineral oil alone and combinations (Tank mix) of both. Untreated check was maintained as control (Table 1). These fungicide treatments were sprayed four times (September, October, November and December) at monthly interval immediately after first appearance of the disease symptoms on leaf. The efficacy of fungicides was recorded on the basis of per cent disease index of yellow sigatoka leaf spot disease by using 0-6 disease rating scale developed by Gauhl *et al.*, (1993). Disease severity was calculated using the formula developed by Wheeler (1993). Yield was recorded as t/ha and benefit cost ratio were calculated.

Rating scale for assessment of yellow sigatoka disease of banana (Gauhl *et al.*, 1993).

0 = No symptoms

1 = Less than 1% of lamina with symptoms (only streaks and / or up to 10 spots)

2= 1 to 5% per cent of lamina with symptoms

3=6 to 15% per cent of lamina with symptoms

4= 16 to 33% per cent of lamina with symptoms

Table 1. Efficacy of fungicidal spray on management of Sigatoka leaf spot of Banana.

Treatment	Pooled PDI	disease reduction control over (%)	Yield (t/ha)	B:C ratio
T1 Petroleum based mineral 1%	26.87 (31.18)	10.97	34.74	1.05
T2 Propiconazole 0.1%	21.95 (27.90)	27.27	42.42	1.29
T3 Mancozeb 0.25%	24.76 (29.80)	17.96	39.48	1.20
T4 Difenconazole 0.1%	23.34 (28.86)	22.66	41.89	1.27
T5 Mancozeb + Carbendazim (0.1%)	22.85 (28.52)	24.29	44.24	1.34
T6 Mineral oil 1% + Carbendazim 0.05%	20.10 (26.64)	33.40	46.97	1.42
T7 Mineral oil 1% + Difenconazole 0.05%	21.06 (27.28)	30.22	46.07	1.40
T8 Mineral oil 1% + Mancozeb 0.125%	20.86 (27.13)	30.88	46.60	1.40
T9 Mineral oil 1% + Propiconazole 0.05%	18.52 (25.48)	38.63	48.45	1.41
T10 Mineral oil 1% + Tebuconazole 50% + Trifloxystrobin 25% WG @0.05%	16.12 (23.66)	46.59	53.30	1.62
T11 Control	30.18 (33.27)	-	32.98	-
SEm		0.45	-	-
CD @ 5%	1.32	-	-	-

Figures in parenthesis indicate Arcsine transformed mean values

5= 34 to 50% per cent of lamina with symptoms

6= 51 to 100% per cent of lamina with symptoms

The per cent disease index of banana sigatoka leaf spot was calculated using the formula of Wheeler, (1993).

The pooled data of two years 2012-13 and 2013-14 (Table 1) on mean infection of leaf spot disease index revealed that, among the five treatments with four fungicide and mineral oil alone, propiconazole 0.1% (21.95) recorded the lowest percent disease severity (21.95%), followed by mancozeb + carbendazim (0.1%) (22.85%), difenconazole 0.1% (23.34%), mancozeb 0.25% (24.76 %) and mineral oil 1% (26.87%) found significantly superior over control (30.18%).

Similar studies were conducted by Paresh (2009) and results revealed that, four sprays of carbendazim @1.0g/l or tridemorph @ 0.7 ml/l or propiconazole @ 1.0 ml/l or thiophanate methyl @ 1.0g/l. at monthly interval starting from six months of planting gave effective and economical control.

Among the five treatments in which fungicides combined with petroleum based mineral oil 1% , T10 (mineral oil 1% + tebuconazole 50% + trifloxystrobin

25% WG @ 0.5 g/l) found superior and recorded the lowest percent disease index (16.12%) followed by T9 (mineral oil 1% + propiconazole 0.05% (18.52%), T6 (mineral oil 1% + carbendazim 0.5 g / l) (20.10%), T8 - mineral oil 1% + mancozeb 2.5 g/l (20.86 %), and T7 - mineral oil 1% + difenconazole 0.5 g/l (21.06%) which showed significantly superior over both control and treatments with fungicide alone.

Results are in agreement with Thammaiah and Shirol (2008), who reported that combination of propiconazole 0.05%+ petroleum based mineral oil 1% effectively controlled the Sigatoka leaf spot disease.

With regard to yield, the highest yield of 53.30 t/ha was recorded in the treatment T10 (mineral oil 1% + tebuconazole 50% + trifloxystrobin 25% WG @0.5 g/l) followed by T9 (mineral oil 1% + propiconazole 0.05 % (48.45 t/ha), mineral oil 1% + carbendazim 0.5 g/l (49.7 t/ha), mineral oil 1% + mancozeb 0.125% (46.60 t/ha) and mineral oil 1% + difenconazole 0.05% (46.07 t/ha) and it was lowest in the untreated check (32.98 t/ha). The B/C ratio was (1.62) in the treatment with mineral oil 1% + tebuconazole 50% + trifloxystrobin 25% WG @0.5 g/l followed by mineral oil 1% + carbendazim 0.5 g / l (1.42).

Perez *et al.*, (2002) also conducted similar studies under field experiment and found that trifloxystrobin (75 and 100 g ai/ha) and azoxystrobin (100 g ai/ha) were effective, for the control of black sigatoka disease caused by *Mycosphaerella fijiensis*.

Gurudatt *et al.*, (2014) conducted field experiment to manage banana sigatoka leaf spot and reported that the plots sprayed thrice with hexaconazole @ 0.1% has significantly reduced the disease incidence to the extent of 13.74% which is on par with three sprays of propiconazole (16.07%) and spray with *Pseudomonas fluorescens* (P)+ *Bacillus subtilis* (Bs)-P+Bs-P+Bs @ 0.1% and 0.5% respectively.

Aman and Rai (2015) reported that yellow sigatoka disease (*M. musicola*), could be effectively managed using combination of the plant extracts (*Orthosiphon diffusus* Benth, *Garcinia cambogia* Gaertn and *Redermachera xylocarpa* Roxb) with captan 70% + hexaconazole 5% (Taqat).

Thus, from the present investigation, it is revealed that sigatoka leaf spot can be effectively managed with four sprays of mineral oil 1% tank mixed with tebuconazole 50% + trifloxystrobin 25% WG @ 0.5 g/l in banana at monthly intervals starting from the first appearance of the disease with highest yield (53.30t/ha).

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