



## Efficacy of Mineral oil with Fungicides in Management of Sigatoka Leaf Spot of Banana

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### ABSTRACT

Field experiments were carried out in the village Thondamandhurai to evaluate the efficacy of Propiconazole 0.1 per cent with mineral oil and second spray of carbendazim 0.05 per cent with mineral oil 1.0 per cent against Sigatoka leaf spot in Banana with farmers practices of applying carbendazim alone in two sprays. The findings revealed that mineral oil with fungicide was effective and significantly superior over farmer's practice in reducing the Sigatoka leaf spot. The results revealed that the significant minimum leaf spot PDI (14.36) was observed in treated field during harvesting stage and pooled Percent Disease Index (PDI) of all months was 15.01. The maximum yield (45.8 t/ha) and BCR (1:1.91) was obtained in treated field.

**Key Words:** Banana, Sigatoka leaf spot, Fungicide, Mineral oil, Yield.

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### INTRODUCTION

Banana (*Musa* sp.) is grown over 120 countries worldwide (Thangavelu and Mustaffa, 2012) covering about 10 m ha with an estimated annual production of 127 Mt. India leads the world in banana production with an annual output of about 14.2 Mt. Banana was cultivated in 2.12 lakh ha area in Tamil Nadu. Sigatoka disease of banana is widely distributed in the world and has already been recognized as a serious threat in Latin American countries (Mourichon *et al*, 1997). The disease is prevalent in almost all banana growing tracts and in almost all the varieties. Sigatoka leaf spot is caused by fungus called *Mycopharella musicola*. The fungus produces leaf spots which later joins and causes yellowing and drying of leaves. A severe incidence of Sigatoka was recorded in banana orchards of South Gujarat during 1976 to 1982 causing drying and defoliation of leaves and premature ripening of fruits in bunches on plants (Vala, 1996). The principal means of spread is through rains but later

with the progressive development, spores are also discharged through air currents thus management of this disease is a difficult task. The present study has been undertaken to manage this disease by foliar sprays of propiconazole 0.1per cent + mineral oil 1.0 per cent followed by carbendazim 0.05 per cent + 1 per cent Mineral oil (Banole) at 20d interval (NRCB, Trichy).

### MATERIALS AND METHOD

An Experiment consisted of two treatments viz., Farmers' practice and ICAR-National Research Centre for Banana (NRCB) technology i.e. Removal and destruction of severely infested and completely dried leaves and foliar sprays of propiconazole 0.1 % + mineral oil 1 % (Banole oil) followed by carbendazim 0.05 % + mineral oil 1 % at 20 d interval. Each treatment was replicated ten times. The first spray was given when typical symptoms of Sigatoka leaf spot observed in a few plants.

**Table 1. Evaluation of fungicides against Sigatoka disease of banana.**

| Treatment | Means of PDI of Sigatoka (%) |      |      |       | Pooled PDI of all months (%) |
|-----------|------------------------------|------|------|-------|------------------------------|
|           | Aug                          | Sep  | Oct  | Nov   |                              |
| T1        | 25                           | 5.49 | 15.2 | 14.36 | 15.01                        |
| T2        | 39.1                         | 34.9 | 38   | 36.88 | 37.22                        |
| SE        | 0.3                          | 0.29 | 0.27 | 0.23  |                              |
| CD at 5 % | 0.8                          | 0.8  | 0.78 | 0.62  |                              |

\* T1-Propiconazole 0.1 % + Petroleum based mineral oil 0.1% followed by carbendazim 0.05 % + Petroleum based mineral oil 1 %

T2- Farmer's practice (Repeated sprays of carbendazim 0.05 %)

The spray solutions were prepared at recommended dosage. Foliar spraying was practiced with hand operated knapsack sprayer. First spray with propiconazole 0.1 per cent plus mineral oil 1 per cent and second spray with carbendazim 0.05 per cent plus mineral oil 1 per cent was given at 20d interval. Disease severity of Sigatoka leaf spot was recorded by following 0 – 6 scale. (Gauhl *et al*, 1993) Where, 0 = No symptoms, 1 = Less than 1 per cent of lamina with symptoms (only streaks and / or upto 10 spots), 2 = 1 to 5 per cent 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, 5 = 34 – 50 per cent of lamina with symptoms and 6 = 51 to 100 per cent of lamina with symptoms. Observations were recorded with respect to PDI and yield parameters (No. of hands/ bunch, No. of fingers/hand and yield t/ha). The Farmers practice was repeated sprays of carbendazim (0.05 %) Per cent disease index (PDI) was calculated by using the following formula (Wheeler, 1969):

## RESULTS AND DISCUSSION

The results revealed that two sprays of propiconazole 0.1 per cent + Petroleum based mineral oil 1 per cent followed by carbendazim 0.05 per cent + petroleum based mineral oil 1 per cent effectively controlled the sigatoka leaf spot disease with mean pooled PDI of 14.36 per cent as compared to 37.22 per cent mean pooled PDI in farmer's practice (Table 1).

The treatment plot recorded more number of average hands/bunch (9.18) as compared to farmer's practice (7.65). Average no. of fingers/hand were recorded as 11.69 in treated plot whereas it was 9.66 in farmer's practice. The mean highest yield of 45.8 t/ha was observed in the treatment of propiconazole 0.1 per cent with mineral oil 1 per cent followed by carbendazim 0.05 per cent + mineral oil 1 per cent and the lower yield (37.1 t/ha) was obtained in the farmer's practice (Table 2). Propiconazole 0.1 per cent + Petroleum based mineral oil 1 per cent followed by carbendazim 0.05 per cent + petroleum based mineral oil 1 per cent treated plots have given highest total returns (Rs. 399144/-), net returns (Rs. 233524/-) and additional returns over farmers' practice of (Rs. 293471/-) and (Rs. 139821/-), respectively The B:C ratio was more (2.41) in the treatment as compared to 1.91 in farmer's practice (Table.3 ).

The present findings are in agreement with Prakash, 2012 where, petroleum oil (Banole oil), which is a biodegradable banana spray oil, is being used extensively in banana exporting countries for the management of the sigatoka disease. This oil is known to improve effectiveness of fungicides and has good penetrating effect *i.e.*, when the oil is spread along with fungicides, it improves the diffusion of active ingredients through the cuticle of the plant. It has fungicidal effect also *i.e.*, the oily film on the surface of the leaf slows down the growth of the fungus and is compatible with commonly used

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**Table 2 . Effect of fungicides on yield parameters in banana.**

| Treatment | Av. No. of fingers/hand<br>(No.) | Av. No. of hands/bunch (No.) | Av. Yield<br>(t/ha) |
|-----------|----------------------------------|------------------------------|---------------------|
| T1        | 11.69                            | 9.18                         | 45.8                |
| T2        | 9.66                             | 7.65                         | 37.1                |

**Table 3. Profitability of Sigatoka leaf spot management in banana.**

| Treatment | Gross Cost<br>(Rs. /ha) | Gross Return<br>(Rs. /ha) | Net Return<br>(Rs. /ha) | B:C ratio (Gross return/Gross Cost) |
|-----------|-------------------------|---------------------------|-------------------------|-------------------------------------|
| T1        | 165620                  | 399144.2                  | 233524.2                | 2.41                                |
| T2        | 153650                  | 293471.5                  | 139821.5                | 1.91                                |

fungicides. Propiconazole 0.1 per cent + Petroleum based mineral oil 1 per cent followed by carbendazim 0.05 per cent + Petroleum based mineral oil 1 per cent recorded its superiority in respect of disease control, yield and quality of fruit than farmer's practice of only application of carbendazim. The result of present findings were more or less similar to the results obtained by Pardeshi *et al* (2015) who reported that the spray of 0.05 per cent propiconazole + 1 per cent mineral oil was superior in respect of disease control, yield and quality of fruit. Similar results on effect of different fungicidal sprays when used in alternation or in combination with other fungicides against sigatoka leaf spot disease of banana have been reported by several workers (Shinde *et al*, 2015; Meena *et al*, 2018).

### CONCLUSION

Removal of heavily affected leaves and foliar spray of propiconazole 0.1 per cent + petroleum based mineral oil 1 per cent followed by carbendazim 0.05 per cent + petroleum based mineral oil 1 per cent at 20d interval can be recommended to the farmers for the efficient management of sigatoka leaf spot of banana. The continuous use of same systemic fungicide may cause resistance or tolerance in pathogenic population. Hence, alternate spray of systemic and contact fungicide with mineral oil at 20d interval can minimize the risk of development of resistance in pathogens and increase the efficiency of fungicide in managing the

Sigatoka leaf spot of banana and increase the yield.

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