

**SPRAY SCHEDULE FOR THE MANAGEMENT OF LEAF SPOT
DISEASE (*MYCOSPHAERELLA EUMUSAE*) IN BANANA**



**R. Thangavelu
N. Marimuthu**

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(R. Thangavelu and N. Marimuthu)

Preamble

Among different production constraints of banana, the leaf spot diseases caused by the *Mycosphaerella eumusae* is considered serious as they reduce the yield and quality of the fruit in almost all the banana growing regions of the world. The eumusae leaf spot disease causes extensive defoliation due to necrotic lesions, which in turn alter the physiology of the plant and in particular reduces the photosynthetic capacity of the plant. This ultimately results in poor fruit filling, fruit quality, early maturity and premature ripening of fruit. In severely affected plants, most of the green leaves are lost and the yield loss can be as high as 20 to 50%. Other indirect effects include delayed flowering, reduced number of hands and fingers, peel splitting, small sized unmarketable bunches with subsequent post-harvest spoilage effects.

Formulation of a spray schedule

For the effective management of the disease, ICAR-NRCB had conducted a series of field trials involving different concentrations of petroleum based mineral oil and fungicides having different mode of actions and formulated a spray schedule programme, which resulted in effective management of the leaf spot disease and also increase in yield in banana. The spray schedule had been validated in different banana growing areas of India such as Arabhavi in Karnataka, Jorhat in Assam, Kannara in Kerala and Kovvur in Andhra Pradesh under All India Coordinated Research Programme on Tropical Fruits. Spraying of mineral oil 1% + any one of the fungicides *viz.* Propiconazole (0.1%) or Carbendazim + Mancozeb combination (0.1%) or Carbendazim (0.1%) or Trifloxystrobin + tebuconazole (1.4 g/litre) 5-7 times at 25-30 days interval controlled the eumusae leaf spot disease effectively and increased the yield by 20%. Mineral oil, which is a biodegradable spray oil for banana is also being used extensively for the management of Sigatoka diseases. It improves effectiveness of fungicides with special features such as (i). Penetrating effect (better diffusion of active ingredients through the plant cuticle); (ii). Fungistatic effect (the oily film on the surface of the leaf slows down the growth of the

fungus) and (iii). Compatibility with commonly used fungicides. In addition to controlling the disease effectively, the technology was found to increase the yield by 20% and the additional income due to the technology is approximately Rs. 60,000-80,000/ acre depending on the variety. At present the technology is being adopted in different banana growing states of India.

Control of the disease in Jalgaon, Maharashtra

The survey conducted by ICAR-NRCB in 2011 in Jalgaon district of Maharashtra, where the banana is grown in about 40,000 ha, indicated that eumusae leaf spot disease caused severe leaf defoliation and mortality resulting in only 2-6 green leaves in most orchards and while few had none at the time of shooting. Surprisingly, even two months old side suckers exhibited leaf spot infection. The bunch emerging out of such diseased plants showed early ripening of fruits with creamy pulp resulting in the rejection of bunches in the markets. Because of the severe yield reduction due to extensive defoliation in Cavendish group of banana in Maharashtra state, Hon'ble Members of Parliament raised questions for the management of leaf spot disease in banana several times in the Parliament. The ICAR-NRCB has informed them about the spray schedule developed through the then Hon'ble Union Minister of Agricultural and Civil Supplies Mr. Sharad Pawarji, who in turn introduced the under mentioned spray schedule technology in a big gathering of farmers meeting in Jalgaon in 2012. At present, the Maharashtra government is adopting this technology through HORTSAP programme in 40 000 ha. of banana for the past 5 years and so far there is no complaint of leaf spot disease. The spray schedule has reduced the yield loss due to Eumusae leaf spot with an additional income up to Rs. 35 crores annually in Maharashtra state alone

Spray schedule:

Days after planting	Qty of chemicals/ litre of water
150 days	Carbendazim 1 g + mineral oil 10 ml
175 days	Propiconazole 1 ml + mineral oil 10 ml
200 days	Carbendazim + Mancozeb combination 1 g + mineral oil 10 ml
225 days	1.4 g of Nativo (Trifloxystrobin+ tebuconazole)/litre + mineral oil 10 ml
250 days	Propiconazole 1 ml + mineral oil 10 ml

275 days	Carbendazim + Mancozeb combination 1 g + mineral oil 10 ml
300 days	Carbendazim 1 g + mineral oil 10 ml

Economics of leaf spot disease management using spray schedule developed by ICAR-NRC for Banana in 2011-12:

Details	Disease severity		Yield ton/acre	Income (@Rs 7/kg)	Expenditure for spraying/acre	Additional income due to spraying /acre
	at bunch maturing phase	Number of green leaves				
NRCBs spray schedule	15.7%	16	38.5	2,69,500	Rs. 4580/-	88,820
Without spraying	79%	7	25.3	1,77,100	Rs. 1000/-	-----



(A). Severe incidence of leaf spot disease in cv. Gran Naine and (B). Premature ripening of fruits in the field itself due to leaf spot disease



Field spraying of banana plants with combination of mineral oil and fungicides for the leaf spot disease management



Good yield of banana in the field sprayed with combination of mineral oil and fungicides