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SPRAY FLUID REQUIREMENTS IN HIGH VOLUME SPRAYING OF RUBBER

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ABSTRACT

An experiment to determine the minimum spray volume required for adequate protection of mature rubber trees against abnormal leaf fall by spraying one per cent Bordeaux mixture revealed that satisfactory leaf retention could be ensured by using 3000 litres per hectare. The reduction in spray volume to 3000 litres from the current recommendation of 5000 litres helped in a saving of Rs. 560/- per hectare.

INTRODUCTION

The abnormal leaf fall disease of rubber *(Hevea brasiliensis)* caused by *Phytophthora* spp. is the most economically important disease in Kerala as it can cause an yield loss upto 30-50% (Ramakrishnan, 1960). Therefore, much importance has been given by planters for prophylactic spraying of fungicides to check the disease. Of the two types of spraying viz., low volume and high volume, the small holders usually prefer high volume spraying with 1% Bordeaux mixture to low volume due to many practical difficulties like the fragmented distribution of holdings, paucity of machines and high capital investments on low volume sprayers. The present study was undertaken to find out an optimum quantity of spray fluid (Bordeaux mixture) for a hectare of mature rubber to get good leaf retention.

MATERIALS AND METHODS

The experiment comprised 6 treatments having 4 replicates each, in which 1% Bordeaux mixture was used at five different volumes viz., 1000, 2000, 3000, 4000 and 5000 litres per hectare, with an unsprayed plot serving as control. This was laid out in randomised block design at Central Experiment Station of RRII, Chethackal, and continued for 3 years. The plot size was 0.1 ha. having mature GG clonal trees of 1969 planting. The spraying was carried out in May prior to the onset of south-west monsoon using rocker sprayers. The delivery hose of the sprayer was attached to a 2.5 metres long bamboo lance fitted with multi-directional duromist nozzle.

To assess the percentage leaf retention of leaves on trees, four trees in the middle of each plot were selected and the leaves from two twigs each from the middle region of the crown of these trees were counted just after spraying and again after the disease season.

RESULTS AND DISCUSSION

Data presented in Table I reveal that T_1 (5000 l/ha) recorded the highest leaf retention in all the three years of trial,

Table I. *Mean percentage leaf retention for 3 years*

Year	Treatments						
	T_0 Unsprayed	T_1 5000 l/ha	T_2 4000 l/ha	T_3 3000 l/ha	T_4 2000 l/ha	T_5 1000 l/ha	
1st year	36.43	59.58	53.71	51.72	46.08	41.28	SE + 3.87
	*(35.63)	(74.05)	(64.55)	(61.53)	(51.83)	(43.68)	CD at 5% 11.66
2nd year	42.41	74.52	71.28	66.20	55.88	51.70	SE 1.74
	(45.53)	(92.65)	(89.00)	(83.45)	(68.50)	(61.43)	CD at 5% 5.24
3rd year	50.72	67.64	66.79	63.59	56.39	57.99	SE 2.17
	(59.88)	(84.35)	(84.23)	(80.13)	(69.08)	(71.63)	CD at 5% 6.54

*Figures within brackets indicate percentage leaf retention
+ SE and CD for angles

followed by T_2 (4000 l/ha) and T_3 (3000 l/ha). T_1 differed significantly to all other treatments in the first year, whereas T_2 and T_3 were at par. However, T_2 and T_3 did not differ significantly within T_1 in the subsequent years. The unsprayed plots consistently showed the lowest leaf retention.

These results indicate that the treatments where low quantity of spray volume (1000 or 2000 l/ha) was used were quite inadequate for sufficient coverage of leaves, whereas T_1, T_2 and T_3 recorded good leaf retention as the quantity of spray fluid could cover the entire canopy.

Earlier field experiments showed that a leaf fall upto 25% did not affect the crop yield whereas 50% leaf fall or more did cause considerable yield drop (Radhakrishna Pillai *et al.*, 1974). Peries (1966) recording similar observations from Sri Lanka opined that when a plant was de-

Table II. *Split up of the cost of spraying for one hectare mature rubber with 5000 and 3000 litres of 1% Bordeaux Mixture*

Items	5000 litres			3000 litres		
	Quantity	Rate Rs. Ps.	Cost Rs. Ps.	Quantity	Rate Rs. Ps.	Cost Rs. Ps.
Copper sulphate	50 kg	16.00	800.00	30 kg	16.00	480.00
Lime	50 kg	1.50	75.00	30 kg	1.50	45.00
Capital investment, repair etc.	–	–	25.00	–	–	25.00
Labour	30 Nos	21.00	630.00	20 Nos.	21.00	420.00
			1530.00			970.00

foliated by a disease or by mechanical means, the efficiency of the remaining leaves enhanced so as to compensate for the loss. When conditions are very much favourable for the disease, the leaf fall can exceed more than 25% even in the plots sprayed with 5000 litres of fungicide/ha, as observed in the first year. But in case of moderate to high infection, more than 80% leaf retention can be ensured with 3000 litres or more per hectare. Considering the economics of spraying and the fact that 25% leaf fall would not affect the crop, T_3 (3000 l/ha) can be preferred to T_2 (4000 l/ha) and T_1 (5000 l/ha). This reduction in spray volume can reduce the spraying cost considerably (Table II).

The scarcity of water in the plantations during the spraying season is one of the major constraints in the high volume spraying in small holdings. As the quantity of water is reduced considerably, the labour requirement can also be reduced proportionately. Data in Table II show that the cost of spraying with 1% Bordeaux mixutre with the current recommendation of 5000 litres is Rs.1530, whereas with 3000 litres the cost can be reduced to Rs. 970/-. Therefore, by the reduction in volume from 5000 to 3000 litres a saving of Rs. 560 per hectare could be effected.

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