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Control of *Gloeosporium* leaf disease in young rubber plantations

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ABSTRACT

Gloeosporium leaf disease has become a serious problem on young rubber plants in certain parts of southern India. Trials were carried out in two consecutive years in a disease prone area on a susceptible clone RRII 105. These used different fungicides with the aim of selecting a suitable fungicide for control of *Gloeosporium* leaf disease. The results showed that mancozeb (0.2%) was the most effective and economic fungicide followed by carbendazim (0.05%) dithianon (0.2) bitertanol (0.25%) and Bordeaux mixture (1%).

Introduction

A leaf spot disease of *Hevea brasiliensis* (Willd ex Adr de juss) Muell Arg., caused by *Gloeosporium alborubrum* (Petch) *(Glomerella cingulata)* (stonem) S & V.S., occurs on young rubber plants in a moderate to severe form in all rubber growing countries. The disease is observed throughout the rubber growing regions in India where it severely attacks budwood plants and seedlings in the nurseries. Young plants in the field are also affected though this has been in a mild form until recent years. The disease has become a serious problem on immature rubber during the first two years in certain parts of South India with the large scale use of new planting-materials and changes in climatic conditions. Severe spotting on young leaves causes heavy defoliation leading to die-back of shoots and general weakening of plants thus retarding growth. Repeated defoliation, sometimes ultimately, results in death of the young plants in highly susceptible clones under suitable conditions. This pathogen, *Gloeosporium alborubum* (presently known as *Colletotrichum gloeosporoides* Penz. & Sacc.), together with a few others are the cause of the most important disease complex, secondary leaf fall, in Malaysia. A number of experiments have been carried out to control the disease[1,2,3,4,5]. In India, copper fungicides are regularly used for prophylactic spraying against abnormal leaf fall disease before the onset of the South-west monsoon and thus *Gloeosporium* disease intensity is reduced[6]. Incidence has become more severe on immature rubber in the recent past and hence the necessity to screen different fungicides has become imperative.

Experimental details

Field trials were carried out for two years in a private estate at Mundakkayam. A highly susceptible (RRII 105) clone planted two months previously was selected for this study. The experiment was carried out during the first and second year. Ten fungicides, *viz* mancozeb (0.2%), carbendazim (0.5%), oxycarboxin (0.1%), thiophanate methyl (0.07%), dithianon (0.2%), bitertanol (0.025%), Bordeaux mixture (1%) + zinc sulphate (0.5%), triadimefon (0.025%) and thiophosphate (0.048%), were included in the Year 1 trial.

Four effective fungicides from the Year 1 trial, *viz* mancozeb (0.2%) carbendazim (0.05%) dithianon (0.2%) and bitertanol (0.025%) together with a new fungicide, Instant Bordeaux (1%), were included in the Year 2 trial. Bordeaux mixture (1%) and an unsprayed control served as the check in both years. The trials were laid out in a randomized block design with three replications for each treatment. The plot size was thirty plants. Eight

rounds of spraying were given from September to December at fifteen day intervals. Disease intensity was assessed periodically on a 0 to 5 disease scale and the percentage disease index (PDI) was calculated using the formula:

$$PDI = \frac{\text{Sum of numerical ratings} \times 100}{\text{Total number of ratings} \times \text{maximum disease grade}}$$

The mean PDI was analysed statistically and the results tabulated.

Results and discussion

Among the 10 fungicides tested in Year 1, mancozeb, carbendazim, dithianon and bitertanol were found to be significantly superior to the unsprayed control in combatting the disease. Mancozeb recorded the lowest PDI and was significantly superior to conventional Bordeaux mixture fungicide. The other treatments, *viz* triademefon, Bordeaux mixture + zinc sulphate, Thiophanate methyl, oxycarboxin and thiophosphate, were on a par with the unsprayed control (Table 1).

Table 1 *Effect of fungicides on Gloeosporium leaf disease in Year 1*

Chemical treatment	Loading (%)	Disease index (%)
Mancozeb	0.2	25.12
Carbendazim	0.05	28.29
Oxycarboxin	0.1	30.53
Thiophanate methyl	0.07	32.91
Dithianon	0.2	29.79
Bitertanol	0.025	29.19
Bordeaux mixture	1.0	30.33
Bordeaux mixture + Zinc sulphate	1.0 + 0.5	31.33
Triademefon	0.025	29.85
Thiophosphate	0.048	33.39
Unsprayed control	-	34.86
C.D. ($P_{\bullet} < 0.05$)	-	4.88

In the Year 2 trial, all of the fungicides tested, *viz* mancozeb, carbendazim, dithianon, bitertanol and Instant Bordeaux, were significantly superior to the unsprayed control (Table 2) and mancozeb continued to record the lowest PDI.

The superiority of mancozeb, carbendazim, dithianon and bitertanol shown in the early trial was also confirmed in the Year 2 trial. These fungicides were also found to be significantly superior to Bordeaux mixture. Instant Bordeaux was comparable to Bordeaux mixture, dithianon and bitertanol in its efficacy but was inferior to mancozeb and carbendazim. In Malaysia, copper fungicides gave good control of the disease[7] and mancozeb has been successfully used for disease control[8] in Java.

In terms of the cost of chemicals, mancozeb was found to be the cheapest followed by Bordeaux mixture and carbendazim. Mancozeb and carbendazin were consistent in checking the disease and these fungicides can be recommnded for the management of *Gloeosporium* leaf disease in India.

Table 2 *Effect of fungicides on Gloeosporium leaf disease in Year 2*

Chemical treatment	Loading (%)	Disease index (%)
Mancozeb	0.2	31.58 (27.50)
Carbendazim	0.05	32.14 (28.33)
Dithianon	0.2	34.75 (32.56)
Bitertanol	0.025	36.72 (35.83)
Bordeaux mixture	1.0	41.64 (44.17)
Instant Bordeaux	1.0	38.73 (39.17)
Unsprayed control	-	52.78 (63.33)
C.D. ($P < 0.05$)	-	4.44

NB: Figures in parentheses indicate actual percentage disease index.

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References

1. Rubber Research Institute of Malaysia, *Gloeosporium., Planters' Bulletin*, 97, 110-113, 1968.

2. Rao, B.S., Azaldin, M.Y., Progress towards recommending artificial defoliation for avoiding secondary leaf fall., *Proc. RRI Malaysia Planters' Conf., Kuala Lumpur 1973*, 267-280, 1973.

3. Rubber Research Institute of Malaysia, Directors Report 1977., *Crop Protection*, 1,49, 1977.

4. Tan, A.M. and John C.K., Economic benefits of disease control in rubber Malaysian experience., *Proc. Int. Rubb. Conf., Kuala Lumpur 1985*, 3, 270-279, 1985.

5. Lim, T.K., Recent developments in the chemical control of rubber leaf diseases in Malaysia., *Proc. Int. Conf. Plant Protection in the Tropics, Kuala Lumpur 1987*, 219-231, 1987.

6. Radhakrishna Pillai, P.N., George, M.K. and Rajalakshmy, V.K., Leaf and shoot diseases. In: *Handbook on Natural Rubber production in India (ed. Radhakrishna Pillai P.N., Puspadas, M.V. and Nair V.K.G.) RRI India*, 249-275, 1980.

7. Rubber Research Institute of Malaysia, *Directors Report 1968.*

8. Soepadmo, B., *Colletotrichum gloeosporoids* Sebagai Penyebab penyakit gugur daun pada karet., *Menara Perkebunan*, 43, 299-302, 1975.