Indian Journal of Natural Rubber Research, 5 (1&2) : 245-247, 1992

EFFECT OF POWDERY MILDEW DISEASE ON THE YIELD OF RUBBER TREES IN KANYAKUMARI DISTRICT

Powdery mildew disease of rubber (*Hevea brasiliensis*) caused by *Oidium heveae* is known to be very severe in Kanyakumari district (Radhakrishna Pillai *et al.*, 1960) but the crop loss due to this disease has not been assessed. The present investigation was aimed at an evaluation of the impact of the disease on two popular clones in this district.

Two experiments were laid out following to paired plot design (Wastie and Mainstone, 1968) in Kanyakumari district in areas planted with the clones PB 86 (location I) and RRIM 600 (location II) during 1983 to 1986 and 1984 to 1987 respectively. Two blocks each of 280 trees planted in 1967 in the first location and four blocks each of 320 trees planted in 1973 in the second location were selected for the experiment. Sufficient guard rows were left in between the blocks. Tapping was on BO2 panel in the first experiment and BO1 panel in the second. All cultural operations except control measures against powdery mildew were carried out uniformly in all the blocks.

Pre-treatment yield was recorded during the first year and the treatments were imposed in the second year. In both the locations one set of plots was protected from powdery mildew disease by dusting sulphur (70% dust), using a power duster carried in every fourth row, at the rate of 12 kg per hectare, per round. Four rounds of dusting at 12-15 day intervals were carried out, the first round being done when bud break after wintering occurred in ten per cent of the trees. The other set of plots was kept unprotected. The blockwise yield and number of tapping days were recorded. Yield projection was made based on pre-treatment yield and crop loss was calculated based on the projected yield. Twenty five trees were selected on the basis of mean girth from each plot. Tree girth at a height of 175 cm from the bud union and thickness of renewed bark at a height of 1 m were recorded (using a Schlieper's gauge) annually.

The disease incidence was recorded using wirenet baskets of size 1 m^2 fixed at random in between the rows as well as between trees in a row. The leaves fallen due to infection by *O. heveae* were counted and expressed as percentage of the total number of leaves in the canopy. Leaf counts were done periodically during the disease season and the subsequent wintering period.

Severe defoliation of trees was observed in the control (unprotected) plots in both the experiments during the period of observation (Table 1). In the clone PB 86,7.7 to 11.8 per cent more disease incidence was noticed resulting in a crop loss of 20.1 to 31.8 per cent. The growth of the tree was also adversely affected when the trees were not protected as indicated by the poor girth

Presented in the International Natural Rubber Conference, 5-8 February 1992, Bangalore, India.

Table 1. **Effect of powdery mildew disease on growth and yield of rubber**

Treatments		Year	Yield tree^{-1} tapping^{-1} (g)	Disease incidence (%)	Girth (cm)	Bark thickness (cm)	Projected yield tree^{-1} tapping^{-1} (g)	Yield loss (%)
PB 86	**Sulphur dusted**							
	Pre-treatment	1983-84	26	12.0	60.1	0.58	—	—
	Treated	1984-85	29	6.6	60.9	0.60	—	—
		1985-86	26	14.6	61.7	0.64	—	—
PB 86	**Unprotected**							
	Pre-treatment	1983-84	26	17.0	61.1	0.60	—	—
	Treated	1984-85	22	14.3	61.4	0.61	29	31.82
		1985-86	21	26.4	61.8	0.64	26	20.09
RRIM 600	**Sulphur dusted**							
	Pre-treatment	1984-85	40	35.7	59.7	0.63	—	—
	Treated	1985-86	48	35.2	60.1	0.66	—	—
		1986-87	37	14.7	60.7	0.67	—	—
RRIM 600	**Unprotected**							
	Pre-treatment	1984-85	49	48.9	60.3	0.61	—	—
	Treated	1985-86	52	42.7	60.4	0.64	58	13.46
		1986-87	35	33.1	61.3	0.64	45	28.57

increment in control (1.44 %) when compared to protected (2.66 %) trees. The rate of bark renewal was higher in protected (10.34 %) trees compared to that in the unprotected (6.66 %).

In the clone RRIM 600, there was 7.5 to 18.4 per cent more disease in unprotected plots resulting in a crop loss of 13.5 to 28.5 per cent. In this clone, girth increment was unaffected by the disease while bark renewal was higher in protected (6.35 %) than in unprotected (4.92 %) plots. The monthly yield pattern in pre and post treatment seasons in one location is represented in Fig. 1.

In the clone PB 86 there was only sparse refoliation after defoliation due to disease while in the clone RRIM 600 refoliation was almost uniform and moderate. The higher soil moisture available in the location with the clone RRIM 600 due to its proximity to a dam reservoir might

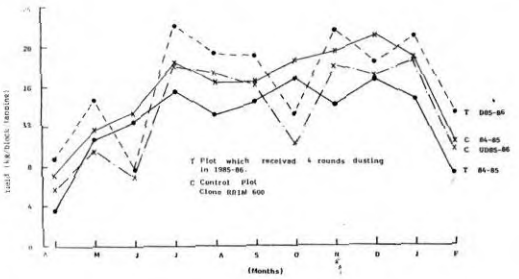

Fig. 1. Yield pattern of dusted and control blocks prior to (1984-85) and after imposing the treatment (1985-86)

have contributed to the uniform refoliation and thereby favoured the girth increment irrespective of the treatments. Older (10 years) trees of the clone PB 5/51 are known to respond more to good protection by way of increased growth than younger (8 years) trees (Wastie and Mainstone, 1968). In the present case also a similar trend is evident. Similar results were reported in the case of abnormal leaf fall disease also (Jacob *et al.*, 1989).

At the present cost of fungicide and labour, one round of sulphur dusting costs Rs.110 per hectare. If four rounds of dusting are required, the cost would be Rs. 440 which can be realised by an increase of 22 kg of dry rubber at a mean cost of Rs. 20 per kg of rubber. As the yield in most of the estates in Kanyakumari district is well above 1600 kg per hectare a crop gain of 1.37 per cent can compensate the cost of control measures.

The authors express their thanks for the co-operation extended by Mr. Raman Pillai of Sri Ramamangalam estate and the management of Vaikuntam estate for the conduct of the field experiments.

REFERENCES

Jacob, C. K., Edathil, T. T., Idicula, S. P., Jayarathnam, K. and Sethuraj, M. R. (1989). Effect of abnormal leaf fall disease caused by *Phytophthora* spp. on the yield of rubber tree. *Indian Journal of Natural Rubber Research*, **2** (2):77-80.

Radhakrishna Pillai, P. N., George, M. K. and Rajalekshmy, V. K. (1980). Leaf and shoot diseases. In: *Handbook of Natural Rubber Production in India* (Ed. P. N. Radhakrishna Pillai). Rubber Research Institute of India, Kottayam, pp. 249 - 278.

Wastie, R. L. and Mainstone, B. J. (1968). Economics of controlling secondary leaf fall of *Hevea* caused by *Oidium heveae* Steinm. *Journal of Rubber Research I nstitute of Malaya*, **22** (1): 64- 72.

C. Kuruvilla Jacob
Thomson T. Edathil
Sabu P. Idicula
K. Jayarathnam

Rubber Research Institute of India,
Kottayam - 686 009,
India.