

Evaluation of Hevea clones against diseases: 1. Susceptibility to pink disease caused by *Corticium salmonicolor*.

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ABSTRACT

Observations on the incidence of pink disease in trials laid out at Rubber Research Institute of India Experimental Station showed that clones RRII 208, PB 260, SCATC 93-114, PB 235, KRS 25, RRIM 703, RRII 118 and PCK 2 showed low disease incidence while clones PCK 1, RRIM 600, PB 217, Haiken 1 and PB 314 showed high incidence compared to clone RRII 105. Other clones included in the trials were moderate in their susceptibility to pink disease. It was also noticed that there was a high incidence of pink disease in the second and third year of planting. During the second year, the pathogen primarily attacked the main forking region but from the next year onwards infection on the first fork reduced and higher forks and branches were more and more infected. Percent disease incidence was more in the second and third year and gradually decreased thereafter.

Introduction

Pink disease, caused by *Corticium salmonicolor* Berk. and Br., is the most important disease of rubber *Hevea brasiliensis* (Willd. ex Ait de Juss.) Muell Arg. during the immaturity period. Generally, the disease causes more damage during the second and third year of planting since at this age the attack of the pathogen is primarily on the first forking region or on the main stem which leads to complete loss of the whole crown. The infection starts with the onset of the South-west monsoon in the months of June and July after which infection progresses and prominent symptoms such as drying of shoots are noticed in the months of September and October. Almost all of the clones cultivated in India are found to be susceptible to pink disease. The high yielding clones RRII 105, RRIM 600 and PB 217 are highly susceptible to the disease¹.

Evaluation for disease susceptibility is a pre-requisite for large scale planting of clones. Once a desired level of reduced susceptibility to a particular disease is identified in any one clone in a vegetatively propagated crop such as *Hevea* then this level can be maintained throughout without any genetic variation. The present study was intended to evaluate different clones with regard to their susceptibility to pink disease.

Experimental details

Two multi-disciplinary trials were laid out at the Experimental Station of Rubber Research Institute of India in a randomized block design. Both trials included 13 clones. Trial I included RRII 5, RRII 105, RRII 118, RRII 208, RRII 300, RRII 308, RRIM 600, RRIM 703, PCK 1, PCK 2, SCATC 88-13, SCATC 93-114 and Haiken-1. Trial II included PB 217, PB 235, PB 255, PB 260, PB 280, PB 310, PB 311, PB 312, PB 314, KRS 25, KRS 128, KRS 163 and RRII 105. Clone RRII 105 was included in both trials for comparison purposes. There were seven replications in Trial I and five replications in Trial II. The plot size was 7 plants per plot. Planting material consisted of polybag plants of the different clones planted in the field in 1989. Observations on pink disease were carried out during 1991, 1992 and 1993 starting from

the month of July and continued at 15 day intervals up to December. Disease intensity was assessed by grading the plants based on the site of infection of the pathogen, ie whether the attack is on the first, second, third or higher forks or on the branches. The percentage disease index was calculated taking into account the data for the three years and the data was analysed statistically.

The infected plants were treated with 10% Bordeaux paste as a curative measure soon after detection of initial symptoms and routine remedial measures were followed².

Results and discussion

Observations on pink disease incidence in the two trials showed that there is variation among the clones regarding their susceptibility to pink disease. In Trial I, clones RRII 208, SCATC 93-114, RRIM 703, RRII 118 and PCK 2 showed low susceptibility to pink disease while clones PCK 1, RRII 105, RRIM 600 and Haiken 1 showed high disease incidence. In Trial II, clones PB 260, PB 235 and KRS 25 showed low incidence of the disease whereas clones PB 217, PB 314, and RRII 105 showed high susceptibility. Other clones included in the two trials showed moderate susceptibility to pink disease (Tables 1 and 2).

Table 1 *Clonal variation in pink disease (Trial I).*

Clone	% disease index (PDI)
PCK 1	44.39 (41.71)
RRII 105	40.82 (39.18)
RRIM 600	35.72 (36.56)
Haiken 1	36.40 (34.95)
SCATC 88-13	34.69 (33.51)
RRII 300	27.55 (30.75)
RRII 5	27.30 (29.32)
RRII 118	23.47 (28.06)
RRII 308	25.51 (27.28)
PCK 2	23.98 (24.76)
RRIM 703	18.62 (23.26)
SCATC 93-114	14.97 (19.54)
RRII 208	12.25 (15.39)
C.D. (P = 0.05)	15.50

Table 2 *Clonal variation in pink disease (Trial II).*

Clone	% disease index (PDI)
PB 217	57.14 (49.36)
PB 314	57.14 (49.18)
RRII 105	57.14 (46.87)
PB 255	40.95 (39.53)
KRS 128	40.71 (38.62)
PB 311	39.29 (37.95)
PB 280	31.31 (33.58)
PB 312	31.43 (33.32)
PB 310	27.14 (30.78)
KRS 163	25.00 (26.78)
KRS 25	17.50 (22.25)
PB 235	17.86 (21.69)
PB 260	13.57 (17.51)
C.D. (P = 0.05)	19.38

Figures in parentheses represent arcsine transformations.

Hence, it can be seen that 8 clones out of the 25 evaluated, viz RRII 208, SCATC 93-114, RRIM 703, RRII 118, PCK 2, PB 260, PB 235 and KRS 25, show a low susceptibility to pink disease. These clones, if associated with high yield and other desirable characters, are suitable for planting in areas highly prone to disease. Of course, the results need to be supplemented by data from multilocational trials. High disease incidence was shown in both of the trials in the case of clone RRII 105 but more disease intensity was recorded in Trial II

compared to Trial I. This may be due to the high humidity prevailing in the experimental area of Trial II which is more favourable for the commencement of the disease.

The study has also shown that high incidence of pink disease occurred in the second and third year of planting. Infection was primarily on the first forking region in the second year. Thereafter infection on the first fork reduced and the top forks and branches became more and more infected (Figure 1). Another observation made from the study is that the recorded percentage of disease incidence was high in the second and third years of planting and reduced in the fourth year (Figure 2).

References

1. Pillai, P.N.R. and George, M.K., Stem Diseases. In: *Handbook of Natural Rubber Production in India* (Ed. P.N. Radhakrishna Pillai) RRI India, 281-285, 1980.
2. Ramakrishnan, T.S. and Pillai, P.N.R., Pink disease of rubber caused by *Pellicularia salmonicolor* (Berk. & Br.) Dastur (*Corticium salmonicolor*) Berk. & Br.), *Rubb. Bd Bulletin*, 5, 120-126, 1962.

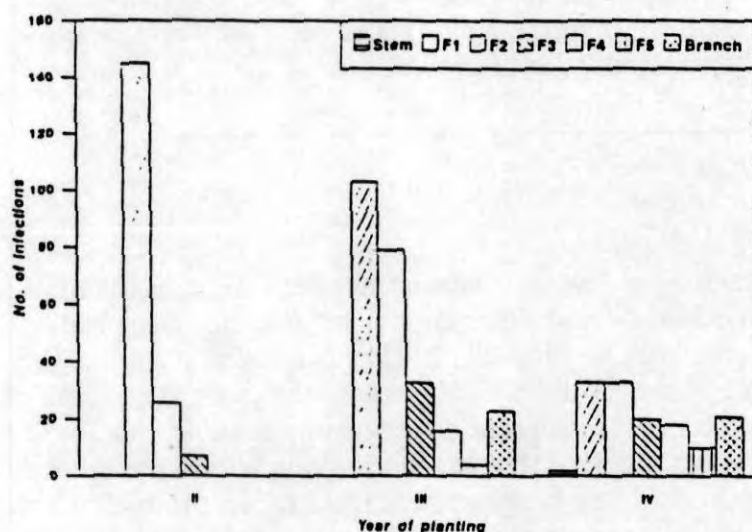


Figure 1 Effect of age of Hevea on site of *Corticium* infection

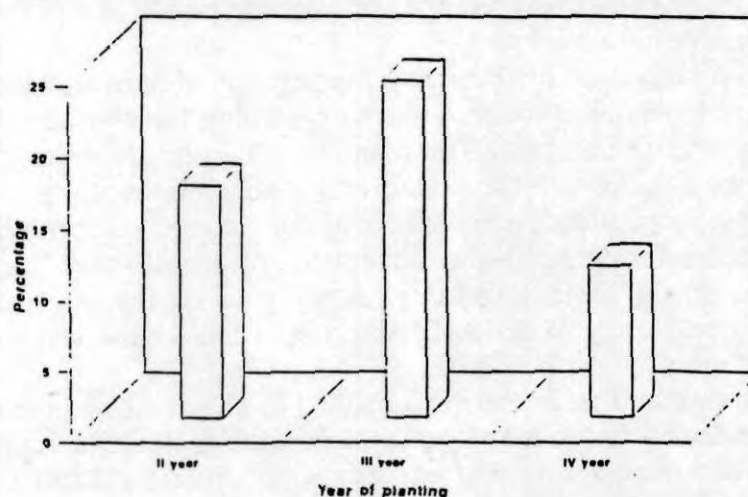


Figure 2 Percent disease incidence of *Corticium* during Hevea immaturity period