

VARIABILITY IN RESPONSE TO *PHYTOPHTHORA* ABNORMAL LEAF FALL DISEASE AMONG CLONES OF *HEVEA BRASILIENSIS* AND RELATIONSHIP BETWEEN THICKNESSES OF LEAF CUTICLE AND DISEASE INCIDENCE

Narayanan Chaendaekattu and Neethu Paul

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

Received: 27 May 2024

Accepted: 15 June 2024

Narayanan, C. and Paul, N. (2024). Variability in response to *Phytophthora* abnormal leaf fall disease among clones of *Hevea brasiliensis* and relationship between thicknesses of leaf cuticle and disease incidence. *Rubber Science*, 37(1): 41-49.

Experimental clones in a central large scale trial (CLST, 2014) at Kottayam (Kerala, India) showed highly significant variation for leaf retention (LR) following incidence of abnormal leaf fall (ALF) disease caused by *Phytophthora*. Clone P 129 had the highest LR (88%) while P 073 showed the lowest LR (44%). Investigation on leaf cuticle thickness of clones in the above trial showed that clones with very low ALF incidence had thicker leaf cuticle and *vice versa*. Another set of twenty five genotypes of *Hevea* spp. comprised of popular clones and pipeline clones of *H. brasiliensis* along with two other species *viz.* *H. benthamiana* and *H. spruceana*, which were assessed for leaf retention after ALF and their corresponding leaf cuticle thickness. It was observed that genotypes with thicker leaf cuticle had low level of ALF disease incidence and *vice versa* conforming to the results obtained for clones in the CLST. Regression analysis indicated a strong relationship between ALF disease and leaf cuticle thickness ($R^2=0.57$). The above study indicated that thicker leaf cuticle possibly play a critical role in imparting high tolerance to ALF disease in *Hevea* which needs further confirmation using larger population of clones.

Keywords: Abnormal leaf fall disease, Disease resistance, *Hevea*, Leaf cuticle thickness

INTRODUCTION

In Para rubber tree (*Hevea*), abnormal leaf fall caused by *Phytophthora* spp. is the most serious disease which causes up to 40 per cent economic loss in rubber yield in susceptible *Hevea* clones (Liyanage and Jacob 1992; Jacob, 1997). Until now, fungicidal spraying is the only viable method suggested for better management of the disease in commercial plantations. Thus, huge amount

of fungicide are used every year which is of great environmental concern. In the current global scenario of high production costs and lack of labour along with long-term environmental impact of harmful fungicides, identification and use of disease resistant clones is the only viable long term strategy for sustainable natural rubber production from commercial plantations.

Plants have developed various resistance mechanisms for avoiding or combating plant