COLD STRESS MEDIATED DAMAGE TO PHOTOSYNTHETIC APPARATUS AND PLANT GROWTH IN YOUNG PLANTS OF *HEVEA*

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To meet its rising demand natural rubber cultivation is being extended to the North Eastern (NE) regions of India where low temperature is a major growth limiting factor. Among the non-traditional areas, there is greater focus on expanding rubber cultivation in the NE region. In the present study, low temperature responses were evaluated in five clones of *Hevea brasiliensis*. Young plants (six to eight-month-old) were grown under ambient tropical conditions successively exposed to low temperature for 14 days by a gradual reduction of temperature from 30°C/22°C to 15°C/7°C and allowing a stress recovery period of five days at 30°C/22°C under controlled condition. Cold stress treatment significantly affected growth in the experimental clones. However, three clones under stress condition *viz.* SCATC 88/13, RRII 208 and RRIM 600 showed better leaf and stem dry weight (DW). Leaf mass fraction (LMF), stem mass fraction (SMF) and leaf thiol content levels were higher in SCATC 88/13, RRIM 600 and RRII 208. When exposed to low temperature there was a reduction in the content of photosynthetic pigments, maximum photochemical efficiency (F_v/F_m) and effective quantum yield of PSII (ΦPSII) in all the genotypes; however, reduction was the least in SCATC 88/13 and RRIM 600. During stress recovery the rate of PSII repairing was better in three clones *viz.* SCATC 88/13, RRII 208 and RRIM 600. Although most of the clones showed sensitivity to low temperature stress, there was variations in cold response and recovery capabilities of the clones in terms of growth and photosynthetic parameters. Overall, clone SCATC 88/13 followed by RRIM 600 and RRII 208 had better tolerance to cold stress.

Keywords: *Hevea brasiliensis,* Low temperature stress, Photochemical efficiency, PSII, Stress recovery

INTRODUCTION

Hevea brasiliensis, naturally distributed in the tropical rain forests of Central and South America, is the prime commercial source of natural rubber (NR). In India, rubber is mostly cultivated in the south-western Malabar Coast that enjoys a warm tropical climate. To meet the increasing demand of NR and shortage of suitable land for cultivation in this traditional region, natural rubber is being extended to subtropical environments where climatic conditions are not best suitable for this crop. North-Eastern (NE) parts of India have been identified as

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