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PHYSIOLOGICAL EVALUATION OF A FEW MODERN *HEVEA* CLONES FOR INTRINSIC DROUGHT TOLERANCE

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Water deficit stress will be one of the most important environmental factors that will affect crop productivity in the coming years and prolonged drought conditions will have adverse effects on photosynthesis and growth of plants. In this study, five modern *Hevea* clones and three check clones were compared for their intrinsic tolerance to water stress conditions. The results indicated that the clone RRIM 600 grown in open condition had the least decline in CO_2 assimilation rate followed by RRII 430, fifteen days after drought imposition while RRII 414 was found to be severely affected. Similar trend was noticed in the glasshouse grown plants 10 days after drought treatment. The effective quantum yield of PS II (Φ PS II) was maintained better in RRIM 600 and RRII 430 while other clones showed drastic decline in PS II activity with drought stress. RRII 430 and RRII 422 showed stable Φ PS II activity under drought conditions. PS I activity was not much affected in stressed plants both in the glasshouse as well as in PEG solution. Among the modern clones, RRII 422, RRII 429 and RRII 430 showed high PS I activity under moisture stress, probably indicating an increased rate of cyclic electron flow around PS I when the PS II function is impaired. Gas exchange and fluorescence data revealed that the clone RRII 430 was more likely to endure drought stress than the others in the RRII 400 series. Gen-Next clones should have better tolerance to changing climatic conditions and the results of the present study help in this direction.

Keywords: Chlorophyll fluorescence, Drought, Photosynthesis, PS I, PS II, Quantum yield.

INTRODUCTION

Water is becoming increasingly limiting in many areas and water deficit stress will be one of the most important environmental factors that limits crop productivity in the changing climate scenario. Drought stress in plants is aggravated by both high solar radiation and increased atmospheric temperature, thereby increasing the magnitude of damage even under a short period of drought.

Natural rubber (*Hevea brasiliensis*) is generally grown as a rainfed crop in the traditional regions. To meet the increasing global demand, the area under natural rubber is currently being expanded to the non-traditional regions where drought and high temperature during summer and low temperature in winter are the critical

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